side. Scales round the body in seventeen rows, abdominals about 156, subcaudals eight to thirteen pairs. Colour of a uniform brown or sometimes quite black, with several deep-red blotches along the sides of the anterior portion of the trunk and about the tail, and rarely several of these are present along the sides of the trunk.

Hab. ——?

The tail of this species is more like that of *Plectrurus* than that of *Silybura*; but I prefer to restrict *Plectrurus* to those species which have a supraorbital shield and only fifteen rows of scales.

The snake I formerly described as *Plectrurus trilineatus* has been placed by Dr. Günther in a new genus, "*Platyplectrurus*:" this has the supraorbital and only fifteen rows of scales, but it differs from *Plectrurus* proper in the presence of an elongated temporal shield over the fourth labial, besides in other points, as noted by Dr. Günther; and I think the genus may stand. *Plectrurus sanguineus* (which I find, on a reexamination of the species, has always fifteen rows of scales only round the centre of the body, not seventeen) will belong to this genus; and I have described two other species, *P. hewstoni* and *P. madurensis*.

My *Plectrurus pulneyensis* has been placed by Dr. Günther in *Rhinophis*; but it should, I think, rather be referred to *Silybura*.

My *Silybura canarica* has been referred to *Plectrurus*: it has only fifteen rows of scales (but it wants the supraorbital); the tail, however, is exactly that of the type of *Plectrurus*, with the points of the terminal scutes one above the other. It may form a distinct section in the genus, or have a new genus constituted for it. The only other *Silybura* described with fifteen rows of scales is *Silybura macrolepis* of Peters, which I have never seen, and its locality is unknown; it has evidently the typical caudal disk of *Silybura*. Dr. Günther omits all mention of this species in his synopsis of the species published in the Society's 'Proceedings' in March 1875.

I wish that I could attach the same importance as Dr. Günther does to the number of the abdominal plates; if he is correct in this, I have several new species of the ocellated *Silyburæ* like *S. ocellata*, *liura*, and *melanogaster*.

Specimens of all the species described in this paper have been sent to the British Museum.

10. On the *Larinæ* or Gulls.

By Howard Saunders, F.L.S., F.Z.S.

[Received December 31, 1877.]

A revision of the *Larinæ* is a more difficult task than that of the *Sterninæ*, the members of the present subfamily being subject to far greater variations in plumage on their passage from youth to age than is customary with the Terns. The latter, although offering differences in individual size and graduation of tint which are often extremely puzzling, may be said to have only two, or at most three, stages of plumage, viz. the immature, the winter-, and the adult

breeding-state, in the last of which the majority assume a black head or crest; but with the Gulls these conditions are more complex. Even in those species which are destitute of hood at all seasons there is a seemingly endless variation in the pattern of the primaries, the general tendency being to an increase in the lighter and a diminution in the darker portions of the webs with the advancing age of the individual—a rule which also holds good with many of those species the adults of which bear a hood in the breeding-season, whilst, on the other hand, there are others which exhibit the apparent anomaly of having a hood in the immature stage, and losing it in the adult plumage. The individual variations in size are even greater than in the Terns; and the range of the Gulls being, as a rule, less extensive, there are to be found several remarkable isolated and specialized forms, side by side with others, which are little more than climatic varieties of a general type. These circumstances have led to the establishment of a multiplicity of genera and of species, many of them exceedingly ill defined; and it was not until I had examined a considerable series of specimens here, and had visited the Museums of Paris, Leiden, Mainz, Berlin, and Copenhagen, for the purpose of identifying the types with the descriptions, that I could hope to clear up some of the more obscure questions.

The literature of this group has been rendered especially intricate through the perverted ingenuity of two systematists who have undertaken its revision. Boie and Brehm are not guiltless in the matter of genera- and species-making; but their labours were chiefly confined to sorting the European Gulls backwards and forwards into fanciful groups, and to splitting up each species into three or four, which can, for the most part, be easily referred back to their origin. But when Bonaparte and Bruch undertook the revision of the *Larinæ* of the whole world, they speedily enveloped the question in a perfect fog of synonymy, their only object being, apparently, to make as many genera and species as possible. Even distinct genera were erected for one and the same species in different plumages; the most closely allied forms were placed far apart, and widely divergent ones were united; whilst it seemed to be accepted as an axiom that a different geographical habitat was sufficient to constitute a species. Revision followed revision; and to the work of the declining days of both these authors we owe at least half of the synonymy which encumbers these pages. It was their intention to perform a similar office for the Terns; but death cut their plans short, and to this is owing the comparative simplicity of the synonymy of the *Sterninæ*.

The result of their labours appears in Bonaparte's last completed list (for that in the 'Conspectus Avium' was never finished), in the 'Comptes Rendus,' xlii. p. 770 (1856), in which he makes 68 "undoubted" species and 22 genera of *Larinæ* alone, besides 5 more species which he considered doubtful—with justice, as regards four of them, two being his own, one Bruch's, and one Wagler's, whilst the fifth, *Larus fuliginosus*, is an excellent species with which he was evidently unacquainted. To this succeeded the

reaction of common sense in the shape of one of Professor Schlegel's admirable Catalogues raisonnés of the Mus. d'Hist. Nat. des Pays-Bas, a monographical review which, in the words of Prof. Blasius, "is destined to be the foundation of all true Gull-knowledge for those whose ideas of what really constitutes a species are not sacrificed to an arbitrary whim or a geographical sport." The remarks which I have thus translated are to be found in a critical review of great merit in the J. f. Orn. (1865, p. 369, and 1866, p. 73). In this Blasius reduces Bonaparte's species to 35—a diminution which to some degree falls into the other extreme, partly owing to the fact that the author was then unacquainted with several perfectly good species, of which series have since become available, and also to his having united some closely allied forms which, in my opinion, are more conveniently treated by giving them specific rank.

As regards the North-American *Larinæ*, Dr. Elliott Coues has contributed two important reviews (Proc. Ac. Nat. Sc. Philad. 1862, p. 291, and 'Birds of the North-west' (1874); and these, coupled with the excellent Revised List of the Neotropical *Laridæ* by Messrs. Sclater and Salvin (P. Z. S. 1871, p. 564), make us better acquainted with the American species than with those of any other great division of the globe. But although there are probably no undiscovered forms, there still remain many details to be learned respecting the haunts, nidification, and various plumages of the American *Larinæ*, especially those of the Pacific-coast islands; and, indeed, there are two from the Galapagos Islands so rare that the one, *L. fuliginosus*, is only to be found in three or four collections, whilst of the other, *Xema furcatum*, only two examples are known to exist, the one in the Paris, the other in the British Museum.

With regard to several of the Old-World species there are also some important gaps to be filled up; but with one solitary exception, viz. *Rhodostethia rosea*, the least-known species and the most interesting forms are those which are found on the shores and islands of the Pacific, on both the Asiatic and American sides. These will be noticed under their respective heads; and I will now pass on to consider the genera and subgenera amongst which the species have been divided. Most of these have been based upon colour, geographical distribution, or upon the mere caprice of the systematist—upon any thing in short *except* those structural differences which afford a valid reason for their employment; but as many of these genera are either used erroneously or in a perverted sense by those who have not studied the question, I will give a full synopsis of them with remarks. Those genera which appear worthy of retention are printed in small capitals.

Genera.

Larus, Linn. Syst. Nat. i. p. 224 (1766).
For all Gulls.

Xema, Leach; J. Ross, App. ii., Ross's Voy. p. 57 (1819).
The generic characters are given as defined *by Leach*; these

are afterwards stated more fully by Stephens in Shaw's Gen. Zool. xiii. p. 176 (1825). Type and sole representative then known, *X. sabinii*. Principal characteristic, the *forked tail*.

Xema, Boie, Isis, 1822, p. 563.

For the European *hooded* Gulls; but

Xema, Boie, Isis, 1844, p. 192,

Includes all those Gulls, either with or without hoods, which he has not otherwise located under *Gavia* or *Larus*.

(N. B. *Gavia*, Moehring, 1752, Gen. Av. is prior to the 12th ed. Linn., and need not be considered; and *Gavia*, Brisson, is undefined.)

Gavia, Boie, Isis, 1822, p. 563.

No description, but is applied to two such structurally different species as *L. eburneus* and *L. tridactylus*.

Gavia, Boie, Isis, 1826, p. 980,

Is limited to *L. eburneus* only.

Gavia, Boie, Isis, 1844, p. 191,

Contains the two former and *L. audouini*.

Gavia, Kaup, Nat. Syst. Eur. Thierw. pp. 99, 196 (1829).

For *L. ridibundus* and "*L. capistratus*."

Gavia, Macgill. Man. Brit. Ornith. p. 239 (1842).

For *all* the *hooded* Gulls, including *Xema sabinii*.

Gavia, Bruch, J. f. Orn. 1853, p. 106.

For the small grey-mantled Gulls *without* hoods.

Rissa, Leach, Stephens in Shaw's Gen. Zool. xiii. pt. i. p. 180 (1825).

Type, *R. brunnichii*=*L. tridactylus*. Character—hind toe absent or rudimentary.

Cheimonea, Kaup, Nat. Syst. Eur. Thierw. pp. 84, 196 (1829).

Type, *R. tridactyla*.

Pagophila, Kaup, *op. cit.* pp. 69, 186 (1829).

Type, *Larus eburneus*.

Leucus, misprint *Lencus*, Kaup, *op. cit.* pp. 86, 196 (1829).

For *L. marinus*, *glaucus*, and *fuscus*; but

"*Leucus*, ex Kaup," Bp. Consp. Av. ii. p. 215 (1857),

Omits the black-mantled species and includes the larger grey-backed Gulls.

Hydrocolœus, Kaup, *op. cit.* pp. 113, 196 (1829).

For *L. minutus* and "*L. plumbiceps*," "Gulls with black heads and white eye-streak."

Ichthyaëtus, Kaup, *op. cit.* pp. 102, 196 (1829).

Type and sole representative, *L. ichthyaëtus*.

Laroides, Brehm, Vög. Deutschl. p. 738 (1831).

Includes most of the European hoodless Gulls.

Chroicocephalus, Eyton, Brit. Birds, p. 53 (1836).

Based upon the coloured hood, small size, and more naked tibia. The latter characteristic only holds good with regard to a limited number of hooded Gulls, and is by no means confined to them; whilst none of the other peculiarities adduced seem to be sufficient for generic distinction.

The spelling of this word has been altered to

Kroicocephalus, Jameson, Journ. Asiatic. Soc. viii. p. 243 (1839),

Chroiocephalus, Reichenbach, Nat. Syst. Vög. p. v.,

Chrœcocephalus, Strickl. Ann. Nat. Hist. p. 40 (1841),

and to

Chroocephalus, Scl. & Salv. P. Z. S. 1871, p. 576 (note)[1].

Rossia, Bonap. Comp. List B. Eur. & N. Am. p. 62 (1838).

For *L. roseus*. No description of generic character; and the name had already been employed otherwise by Owen.

Rhodostethia, Macgill. Man. Brit. Orn. pt. ii. p. 252 (1842).

Type, *L. roseus*. Generic character described.

Cetosparactes, Macgill. Man. Brit. Orn. pt. ii. p. 251 (1842).

Type, *Pagophila eburnea*. Generic character described. Name altered to

Catosparactes, Gray, Gen. Birds, iii. p. 655, note (1845).

"*Plautus*, Klein," Reichenbach, Nat. Syst. Vög. Longip. p. 5 (1852).

(*N. B.* Klein's Hist. Av. Prodromus, pp. 146–148 (1750), is out of date; and his *Plautus* includes Auks, Gulls, and Petrels.)

Glaucus, Bruch, J. f. Orn. 1853, p. 101.

For the large and medium-sized *grey-mantled* species.

"*Gabianus*, Bp.," Bruch, J. f. Orn. 1853, p. 100 (description); Bonap. Naumannia, 1854, pp. 211, 215; Consp. Av. ii. p. 212 (1857) Type, *L. pacificus*.

[1] Whilst these sheets are passing through the press, Mr. H. T. Wharton ('Zoologist,' March 1878, p. 105) has pointed out the existence of an adjective, χρωϊκὸς, meaning coloured; so that Eyton's error (if any) appears to have been merely the omission of the marks of diæresis over the second vowel.—H. S.

Gavina, Bp. Naum. 1854, p. 212.

For *L. canus* and allies, and *L. audouini*; but in

Gavina, Bp. Consp. Av. ii. p. 222 (1857),

the type and sole representative is *L. audouini*.

Dominicanus, Bruch, J. f. Orn. 1853, p. 100; id. *op. cit.* 1855, p. 280.

For the large dark-mantled Gulls, including the author's idea of what *L. cachinnans* of Pallas should be.

"*Leucophæus*, Bp.," Bruch, J. f. Orn. 1853, p. 108 (description).

Type and sole representative, *L. scoresbii*; but

Leucophæus, Bonap. Naumannia, 1854, p. 211,

also includes *L. heermanni*; and in

Leucophæus, Bp. Consp. Av. ii. p. 231 (1857),

are substituted for the latter *L. fuliginosus* and *L. belcheri*.

"*Blasipus*, Bp.," Bruch, J. f. Orn. 1853, p. 108 (description).

Type and sole representative, *L. modestus*, Tsch.; but

Blasipus, Bonap. Naumannia, 1854, p. 211,

also includes *L. crassirostris*, Vieill., and, in the Consp. Av., further includes *L. heermanni*.

"*Adelarus*, Bp.," Bruch, J. f. Orn. 1853, p. 106, "*Edelmöwen*."

For those species which have both a dark mantle and a hood.

Gelastes, Bonap. Naumannia, 1854, p. 212 (descr. nulla).

For *L. gelastes* and the small *unhooded* southern Gulls.

Atricilla, Bonap. Naumannia, 1854, p. 212.

For *L. atricilla* and the three other pretended species evolved from it.

Creagrus, Bonap. Naumannia, 1854, p. 213 (descript. nulla); Bruch, J. f. Orn. 1855, p. 292 (descr.).

Type, *L. furcatus*.

Gavia, Br. { Subgen. *Melagavia*, *Gavia*, *Cirrhocephala* } Bonap. Naumannia, 1854, pp. 212, 213.

For certain hooded Gulls.

Cirrhocephalus, Bruch,

For a species which had a grey hood!

Bruchigavia, Bp. Consp. Av. ii. p. 228.

A genus playfully made, because Bruch's *Gaviæ* were not the

same as the author's *Gaviæ*! Its only claim to remembrance is its adoption by Mr. W. L. Buller as a genus for a New-Zealand species.

Procellarus et *Epitelarus*, Bonap. Naumannia, 1854, pp. 211, 213.

Genus defined. Type and sole representative, *P. neglectus*, which is an immature *L. scoresbii*. This species the author had already located in the genus *Leucophæus*.

Clupeilarus, Bonap. Consp. Av. ii. p. 220 (1857).

For *L. fuscus*, *cachinnans*, and *verreauxii*. This genus has not even the merit of consistency; for it contains such different species as above, whilst it omits *L. dominicanus* (of which *L. verreauxi* is only the African form) and *L. marinus*.

Of the rejected genera one of the best is *Gabianus*, Bp., of which the sole representative, *L. pacificus*, has a remarkably deep, strong bill. But it differs in no other structural point from other typical species of *Larus*, whilst even in the form of the bill it is at times closely approached by old males of *L. dominicanus*; so that I think its adoption would be inexpedient. *Leucophæus*, Bp., has been confused between the author and Bruch until it includes species which Bonaparte himself has almost simultaneously located in two other genera; and I can see no structural difference sufficiently marked to make it desirable to employ either it or *Blasipus*, which, according to Bonaparte's latest view, includes two species differing considerably in the form of the bill. *Adelarus*, Bp., appears to be the result of an attempt to Latinize the compound word "Edelmöwen," and should rank with his *Bruchigavia* and kindred genera.

The arrangement of the species of *Larus* is matter of considerable difficulty. The plan adopted by Schlegel of dividing the Gulls into *Lari marini*, for unhooded species, and *Lari cucullati*, for those which at one time or another bear a hood, will not stand the test of later experience,—almost all of those which have a hood in their immature stage being emphatically *Sea*-gulls, as are also a few of those which have a hood in the breeding-season; whilst at least two of the unhooded species are partial to inland waters, and present, in consequence, the slight modifications of form shown by many of the hooded marsh-breeding Gulls. Under these circumstances any ascending or descending arrangement must necessarily be artificial; but I have endeavoured to group the species in the most natural manner which seemed to me to be practicable.

It may be as well to observe that by an "adult" bird I mean one which has lost the mottlings, barred tail, and other signs of immaturity; but an "old" bird is often subject to important alterations in the coloration or "pattern" of the webs of the primaries, although the general plumage may undergo no material change. The distinction between the age (in years) of the individual and the age (in months) of the primary and other feathers should also be held in

mind, to prevent confusion, although I have endeavoured to avoid any ambiguity on this point.

Genus Pagophila.

The short stout bill, coarse rough feet with serrated membranes, much excised webs, and strong curved claws appear to entitle this species to generic separation. The hallux is connected on the inside of the foot by a serrated membrane with the inner toe, a peculiarity which I do not recollect seeing noticed elsewhere. The name has been in use for nearly half a century, and is of general acceptance.

1. Pagophila eburnea (Phipps).

Larus eburneus, Phipps, Voy. N. Pole, App. p. 187 (1774); Gm. Syst. Nat. i. p. 596 (1788); Scoresby, Arct. Voy. i. p. 535 (1820) (Spitzbergen); Schl. Mus. P.-Bas, *Lari*, p. 6 (1863).

Larus candidus, Müller, Prodromus, p. viii. (1776); O. Fabr. Faun. Grœn. p. 103 (1780).

Larus niveus, Bodd. T. des Pl. Enl. p. 58, no. 994 (1783) (nec Pallas).

Larus albus, Schäff. Mus. Orn. p. 65, tab. 42 (1789).

Gavia eburneus, Boie, Isis, 1822, p. 563; Brehm, Vög. Deutsch. p. 765 (1831).

Pagophila eburnea, Kaup, Nat. Syst. eur. Th. pp. 69, 196 (1829); Gray, Gen. Birds, iii. p. 655 (1849); Newton, Ibis, 1865, p. 507 (Spitzbergen, breeding); P. Wright, Ibis, 1866, p. 217 (Polynia Island, breeding); Dresser, B. of Eur. pts. lix. lx. May 1877.

Gavia nivea, Brehm, Vög. Deutsch. p. 766 (1831).

Cetosparactes eburneus, Macgill. Man. Brit. Orn. pt. ii. p. 252 (1842); Brit. Birds, vol. v.

Larus brachytarsus, Holb. Fn. Grœnl. p. 52 (1846).

Pagophila eburneus, Bruch, J. f. Orn. 1853, p. 106.

Pagophila brachytarsa, Bruch, J. f. Orn. 1853, p. 106; Lawr. B. N. Am. p. 856 (1858); *vide* Reinht. Ibis, 1861, p. 18.

Pagophila nivea, Bp. Compt. Rend. xlii. p. 771 (1856); Consp. Av. ii. p. 230 (1857).

Larus (*Pagophila*) *eburnea*, Coues, B. N.W. Am. p. 648 (1874).

Hab. Arctic regions, from Novaya Zemlya to Baffin's Bay, and the eastern portion of Arctic America, but not as yet found in the North Pacific. Straggles down the western coast of Europe and Eastern America in winter. I can see no reason for considering Holböll's *L. brachytarsus* to be a distinct species.

Genus Rissa.

The principal characteristic assigned to this genus by Leach is the rudimentary character, or absence, of the hind toe. As this is not always constant, and as certain rare individuals from the North Pacific out of many hundreds, are occasionally to be found with a visible hind claw, and even with a nail, it has been urged by some systematists that it is not a valid genus. The

strongest evidence against it is that brought by Dr. Cones in his 'Birds of the North-West,' p. 646, where he says that whereas "a part of the Kittiwakes from the North Pacific are not distinguishable *in any way* from the North-Atlantic bird, others have the hind toe as perfectly formed and proportionately as large as in any species of *Larus*! And there is a gradation between them." He goes on to cite an extreme example from Plover Bay, with a hallux, including the nail ·2 in., with a perfect claw. Whilst writing this paper I have received, through the kindness of the authorities of the Smithsonian Institution at Washington, a similar extreme form with a hallux and nail ·2 in., the claw being well formed and curved, although the whole is certainly but small for the size of the bird, as may be seen by a comparison with a species of about the same size, *L. canus*, in which the hallux and nail measure ·5 in. Mr. O. Salvin has also lent me two specimens, both, as well as my own, from Alaska, in the one of which the nail is somewhat less developed, whilst in the other it is absent, as in the Atlantic bird. It is probable that this extreme form is both rare and local; at least I have never been able to find any but these two examples amongst the many Kittiwakes, Pacific and others, which I have examined. However, there it is; and if the genus *Rissa* depended solely upon the absence of the hind toe, it would have to be given up. There are, however, other structural characteristics, which, when united, seem to me to have weight. The *tarsus* is *remarkably short*, being only 1·2 against 1·9 in. in length of middle toe and claw, proportions unknown in any other group of Gulls; the shape of the curved bill is also peculiar; the *tail* is visibly although not deeply, *forked*; whilst these structural differences are supplemented by such minor characteristics as the peculiar livery of the immature bird, totally unlike that of the adult, or of the young of any other species, and by its exclusively crag-nesting habits. Bearing all these points in mind, I think that, although it is no longer absolutely correct to say that the genus *Rissa* depends upon the absence of the hallux, yet it is advisable to retain it as, on the whole, a valid natural division, sanctioned, moreover, by general use during upwards of half a century.

2. Rissa tridactyla (Linn.).

Larus rissa, Linn. Syst. Nat. i. p. 224 (1766); Phipps, Voy. N. Pole, App. p. 187 (1774); Leach, Syst. Cat. Brit. Mus. p. 40 (1816); Scoresby, Arct. Voy. i. p. 534 (1820).

Larus tridactylus, Linn. Syst. Nat. i. p. 224 (1766); O. Fabr. F. Grœnl. p. 98 (1780); Gm. Syst. Nat. i. p. 595 (1788); Schl. M. P.-Bas, *Lari*, p. 31 (1863); Godman, Ibis, 1872, p. 222 (Canaries).

Larus albus, P. L. S. Müller, Natursystem, p. 108 (1776) (based on Buffon's Mouette cendrée tachetée).

"*Larus cinerarius*, Linn." O. Fabr. F. Grœnl. p. 101 (1780), nec Linn. (winter-plumage, from description).

Larus riga (mispr.), Gm. Syst. Nat. i. p. 594 (1788).

Larus nævius, Schäff. Mus. Orn. p. 64 (1789).

Larus torquatus et *Larus gavia*, Pallas, Zoogr. Rosso-As. ii. pp. 328, 329 (1811).

Gavia tridactylus, Boie, Isis, 1822, p. 563.

Rissa brunnichii, Stephens, ex Leach, in Shaw's Gen. Zool. xiii. pt. i. p. 181, pl. 21 (1825), type of genus *Rissa*.

Cheimonea tridactylus, Kaup, Nat. Syst. eur. Th. pp. 84, 196 (1829), type of genus *Cheimonea*.

Laroides tridactylus, Brehm, Vög. Deutschl. p. 754 (1831).

Laroides rissa, id., *op. cit.* p. 755 (1831).

Laroides minor, id., *op. cit.* p. 756 (1831).

Rissa cinerea, Eyton, Cat. Brit. B. p. 52 (1836).

Rissa tridactyla, Macgill. Man. Brit. B. ii. p. 249 (1842); Hist. Brit. B. v. p. 515; Gray, Gen. Birds, iii. p. 655 (1849); Bruch, J. f. Orn. p. 103 (1853); Bp. Consp. Av. ii. p. 225 (1857).

"*Rissa brachyrhynchus* (Gould)," Bruch, J. f. Orn. 1853, p. 103, nec Gould.

Rissa borealis et *gregaria*, Brehm, Naum. 1855, p. 294.

"*Rissa niveus* (Pall.)," Bruch, J. f. Orn. 1855, p. 285, nec Pallas.

Rissa kotzebui, Bp. Consp. Av. ii. p. 226 (1857).

Larus (*Rissa*) *tridactylus*, Coues, B. N.W. Am. p. 644 (1874).

Larus tridactylus, var. *kotzebui* (Bp.), ibid. p. 646 (1874).

Hab. Arctic region, and along the sea-coasts of the subarctic region, down to about 40° N. lat., breeding perhaps even in the Canaries (*Godman*); in winter it is abundant about the Azores, Canaries, and opposite coast of Africa. In America it is found on both Atlantic and Pacific coasts, but does not seem to extend far down the latter, nor to Japan or China even in winter.

In treating of the genus, I have already noticed that examples are occasionally found about Alaska and the Aleutian Islands with a minute but tolerably developed hind toe, and, at times, with a visible nail, a variation which is rare and *not always equal in extent, even on both feet of the same individual.* I have therefore treated var. *kotzebui* as a synonym, there being no other difference between this and the ordinary Kittiwake, and a gradation between them existing.

3. Rissa brevirostris, Brandt.

Larus brachyrhynchus, Gould, P. Z. S. 1843, p. 106; Zool. Voy. of "Sulphur," p. 50, pl. 34 (1844), nec Richardson (1831).

"*Rissa nivea* (Pall.)," Gray, Gen. Birds, iii. p. 655 (1849), nec Pallas; Lawr. B. N. Am. p. 855; Elliot, B. N. Am. pl. 54.

"*Rissa brevirostris*, Brandt," Bruch, J. f. Orn. 1853, p. 103; id. 1855, p. 285; Dall and Bann. Tr. Chic. Ac. i. 1869, p. 305.

"*Gavina citrirostris*, Schimper," Bruch, J. f. Orn. 1855, p. 284 (Kamtschatka).

Rissa brachyrhyncha, Bp. Consp. Av. ii. p. 226 (1857); Coues, P. Ac. N. Sc. Philad. 1862, p. 306.

Larus warnecki, Coinde, Rev. et M. Zool. 1860, p. 401 (Aleutian Islands).

Larus brevirostris, Coues, Key Am. B. p. 315 (1872); Elliot's Prybilov Is. Birds, no. 553.

Larus (*Rissa*) *brevirostris*, Brandt; Coues, B. N.W. Am. p. 646 (1874).

Hab. The North Pacific, between Alaska and Kamtschatka, where it is very abundant, breeding in thousands on the Prybilov Islands.

This is a very distinct species, and may at once be recognized by its very short stout bill, *orange-red legs and feet*, and dark mantle; the ground-colour of the primaries is also dark grey. I am indebted to the liberality of the authorities of the Smithsonian Institution for a fine specimen of this species, which is as yet rare in collections.

A variation in the hind toe and nail, similar to that in *R. tridactyla*, although in a smaller degree, is observable in this species. My own specimen has no claw on the right hind toe, and only a minute black speck on the left; of two others, from Alaska (e Mus. Salvin & Godman), the one has no hind nail whatever, whilst the other has small black nails, unequal in size, on both hind toes.

Genus Larus.

4. Larus glaucus, Fabr.

Larus glaucus, O. Fabricius, Faun. Grœnl. p. 100 (1780, ex Brünn.); Gm. Syst. Nat. i. p. 600 (1788); Scoresby, Arct. Voy. i. p. 535 (1820); Middendorff, Sib. Reise, ii. p. 241 (1853); Newton, Ibis, 1865, p. 509; Schlegel, Mus. P.-Bas, *Lari*, p. 4 (1863); Coues, B. N.W. Am. p. 620 (1874); Swinhoe, Ibis, 1874, p. 165 (Japan); Seebohm & H. Brown, Ibis, 1876, p. 453 (Lower Petchora); Dresser, B. of Europe, pts. lix., lx. (1877).

"*Larus giganteus*, Temm," Benicke, Ann. Wetterau. Gesellsch. iii. p. 140 (1814).

Larus leucceretes, Schleep, N. Ann. Wetterau. G. i. p. 314 (1819).

Larus consul, Boie, Wiedemann's Zool. Mag. p. 126.

Larus islandicus, Edmonst. Mem. Wern. Soc. iv. (1822) p. 185 (nec Edmonst. *op. cit.* p. 506 = *L. leucopterus*).

Larus glacialis, Macgill. Mem. Wern. Soc. v. pl. i. p. 270 (1824).

Leucus glaucus, Kaup, Natürl. Syst. p. 86 (1829).

"*Larus glacialis*, Benicke," Brehm, Vög. Deutschl. p. 732 (1831).

Larus hutchinsii, Richards. F. Bor.-Am. ii. p. 419, note (1831); Cassin, P. Philad. Ac. 1862, p. 290; Coues, ibid. p. 294; Elliot, B. N. Am. ii. pl. 53; Dall. & Bann. Tr. Chic. Ac. p. 304 (1869).

Plautus glaucus, Reich. Nat. Syst. Av. Longip. p. 5 (1852); Ic. Av. pl 47. fig. 316–318, pl. 50. fig. 2640.

Glaucus consul (Boie), Bruch, J. f. Orn. 1855, p. 101.

Laroides glaucus, Bruch, J. f. Orn. 1855, p. 281.

Hab. Arctic regions; seldom breeding much to the south of the arctic circle. In winter it goes southwards, and has been known to straggle as far as the Mediterranean, to Long Island on the Atlantic coast of America, also on to the coasts of Japan, whence I have seen specimens obtained at Hakodadi by Capt. Blakiston.

L. hutchinsii I consider to be an immature *L. glaucus* in the stage where the mottled brown of immature plumage has passed away, and the pearl-grey mantle has not yet begun to show. This stage lasts but a short time, which will account for the fact that this supposed species has so rarely been obtained; but I have always observed in young specimens in captivity that at this stage they are nearly, and sometimes quite, white. A fine example in this state, obtained off Japan by Capt. St. John, H.M.S. 'Sylvia,' is in the Marquis of Tweeddale's collection. Mr. Collett obtained one in Norway in September 1871; and several have been recorded from America.

The feet and legs in adults of this Gull are *bright flesh-pink*, and not lemon-yellow as depicted by an extraordinary freak of the colourist in Mr. Dresser's 'Birds of Europe.'

5. Larus leucopterus, Faber.

Larus argentatus, E. Sabine, Tr. Linn. Soc. xii. p. 546 (nec auctt.).

Larus leucopterus, Faber, Prod. Isl. Orn. p. 91 (1822); Sw. & Rich. F. Bor.-Am. ii. p. 418 (1831); Schl. Mus. P.-Bas, *Lari*, p. 5 (1863); Dall. & Bann. Tr. Chic. Ac. i. 1869, p. 304 (Alaska and Lower Yukon); Coues, B. N.W. Am. p. 622 (1874); Dresser, B. of Europe, pt. xlix (1876).

"*Larus glaucoides*, Temm." Meyer, Taschenb. iii. p. 197 (1822); Boie, Isis, 1822, p. 562.

Larus glaucoides, Temm. Pl. Col. 77^{e} livr. Introd. *Larus* (1828).

Larus islandicus, Edmonst. Mem. Wern. Soc. iv. p. 506 (1823) (nec Edmonst. *op. cit.* p. 185).

Larus arcticus, Macgill. Mem. Werner. Soc. v. no. xiii. p. 268 (1824) (large specimen).

Larus minor, Brehm, Vög. Deutschl. p. 736 (1831).

Laroides glaucoides, Brehm, *op. cit.* p. 744.

Laroides leucopterus, Brehm, *op. cit.* p. 745; Bruch, J. f. Orn. 1855, p. 281.

Laroides subleucopterus, Brehm, *op. cit.* p. 746.

Glaucus leucopterus, Bruch, J. f. Orn. 1853, p. 101.

Glaucus glacialis, Bruch, *op. cit.* p. 101.

Larus chalcopterus, Licht. Nomencl. Av. Mus. Berol. p. 99 (1854), sine descr. (type examined, H. S.).

? *Laroides chalcopterus* (Licht.), Bruch, J. f. Orn. 1855, p. 22.

Laroides glacialis, Bruch, *op. cit.* 1855, p. 282.

Leucus chalcopterus, Bp. Consp. Av. ii. p. 216 (1857).

Leucus arcticus, Bp. *op. cit.* p. 216.

Leucus leucopterus, Bp. *op. cit.* p. 217.

Hab. Even more thoroughly arctic, during the breeding-season, than *L. glaucus*; straggling southward in winter as far as the coast of France. It is not even authenticated as breeding in Iceland or Spitzbergen; but it does so within the arctic circle from Greenland to Behring's Straits. It also breeds in Alaska; and I have examined a specimen which was obtained in Japan by Capt. Blakiston.

6. Larus glaucescens, Licht.

Glaucus glaucescens (Licht.), Bruch, J. f. Orn. 1853, p. 101 (type examined, H. S.).

"*Glaucus glaucopterus*, Kittlitz," Bruch, J. f. Orn. 1853, p. 101.

Larus glaucopterus, Licht. Nomencl. Av. Mus. Berol. p. 99, sine descr. (1854), Behring's Straits, Chamisso (type examined, H. S.).

Laroides glaucescens, Bruch, J. f. Orn. 1855, p. 281.

Leucus glaucescens, Bp. Compt. Rend. xlii. (1856) p. 770; Consp. Av. ii. p. 216 (1857).

Larus glaucescens, Licht.; Lawr. B. N. Am. p. 842 (1858); Coues, Proc. Philad. Ac. 1862, p. 295; id. B. N.W. Am. p. 622; Swinhoe, Ibis, 1874, p. 165 (Japan).

Larus chalcopterus, Lawr. B. of N. Am. p. 843, 1860; Coues, Proc. Philad. Ac. 1862, p. 295 (nec Licht.).

Hab. Pacific coast of North America up to Behring's Straits, and, on the Asiatic side, Kamtschatka, and as far south as Hakodadi, Japan, whence I have seen a specimen obtained by Capt. Blakiston.

This apparent link between the large Gulls with white primaries and those with barred primaries may be roughly described as a Herring-Gull with the black portion of the primary-pattern nearly washed out. It is quite unmistakable. The changes of plumage in its progress to maturity show, however, that its relationship to *L. glaucus* is closer than to *L. argentatus*.

7. Larus argentatus, Gm.

Larus fuscus, Penn. Brit. Zool. ii. p. 131 (1768), nec Linn.; Mont. Orn. Dict. i. (1802).

Larus argentatus, Gm. Syst. Nat. i. p. 600 (1788), ex Brünn.; Schl. M. P.-Bas, *Lari*, p. 16 (includes allies); Gundlach, J. f. Orn. 1857, p. 236 (Cuba); B. du Bocage, Jorn. Soc. Lisb. 1868, pp. 149, 330 (Angola); Hartlaub, Syst. Orn. W.-Afrik. p. 251 (1857), Senegal; Dresser, B. of Europe, pt. xxii. (Oct. 1873); Coues, B. N.W. Am. p. 625, 1874.

Larus marinus, var. *β*, Latham, Ind. Orn. ii. p. p. 814 (1790).

Larus glaucus, Retzius, F. Suec. i. p. 156 (1800), nec Brünn.; Meyer & W. Taschenb. ii. p. 471 (1810).

Larus cinereus, Leach, Syst. Cat. Brit. Mus. p. 40. (1816).

Larus argentatoides, Brehm, Beitr. Vögelkunde, iii. pp. 791, 799 (1822).

Larus argenteus, Macgill. Mem. Wern. Soc. v. p. 264 (1824).

"*Larus argentatoides* (Bonap.)," Sw. & Richards. F. Bor.-Am. Birds, p. 417 (1831), nec Brehm, nec Bonap.

Laroides major, argentatus, argenteus, argentatoides, et *argentaceus*, Brehm, Vög. Deutschl. pp. 738–743 (1831).

Glaucus argentatus, Bruch, J. f. Orn. 1853, p. 101.

Glaucus argentatoides, Bruch, *op. cit.* p. 101.

Larus marinus, Gundl. J. F. Orn. 1857, p. 236; Lembeye, Aves, de Cuba, p. 122 (1850), *cf.* Gundl. J. f. Orn. 1871, p. 291.

Larus smithsonianus, Coues, Pr. Ac. N. Sc. Philad. 1862, p. 296 (North America).

In this species the amount of white on the primaries increases with the age of the individual. Mr. Dresser (B. of Europe, xxii. *L. argentatus*, p. 3) describes an adult male from the Orkneys in summer, in my collection, as having "the outermost primary almost entirely blackish, white towards the tip, and crossed by a subapical black band; the next two grey at the base, black towards the tip, being finally terminated by a large white spot." This is correct, so far as any breeding bird with unspotted pearl-grey mantle may be termed *adult*; but the example in question is far from being an *old* bird. Bearing in mind that the *extreme* white tip diminishes by abrasion with the age of the *feather*, the following are the patterns of the outer primaries with the increasing age of the bird:—On the outer primary the white spot, or "mirror," absorbs the black bar till the latter wholly disappears, leaving the primary pure white from the tip to more than two inches upwards; whilst from above, a grey "wedge" along the inner web gradually eats into the black portion, reducing the width of the black along the inner web to only two inches. In the second primary a white "mirror" appears, which also increases with the age of the bird; but in this feather, so far as I have yet seen, it does not wholly absorb the black bar and unite with the white tip; what it does, however, is to eat round the black above it, so as to cut off the black from the inner web, and thus unites with the grey wedge, which has been gradually increasing its dimensions downwards. It is needless to give a minute description of the remaining primaries; it will suffice to say that, as a rule, the encroachment of the light portions upon the dark ones increases with the age of the bird, and there may easily be stages of further progression with which I am not yet acquainted. This grey "wedge" on the upper portions of the primaries should be borne in mind, as it is an important distinction between some closely allied species. These observations equally apply to the Yellow-legged Herring-Gull (*L. cachinnans*) and to the American bird which Dr. Coues formerly distinguished as *L. smithsonianus*. Dr. Coues, although he has given it up as a species, even now maintains (B. of N.W. Am. p. 628) that if a subapical spot (or "mirror") is present on the second primary of the American bird, it is small; but in two examples before me, of the correctness of whose locality I am well assured, the one from Grand Manan, in June, has it well developed, whilst in another, from Long Island, the mirror extends right across the feather, and on the inner web has nearly eaten through the black and effected a junction with the grey wedge above. Indeed only one European bird in my collection has the mirror still more developed. The average of American *may* possibly be a little larger than the average Old-World specimens; but I have not examined a sufficient series of the former to speak with the same confidence upon this point that Dr. Coues does; at any rate that difference is admittedly unworthy of specific distinction. The *mantle* in the true adult *L. argentatus* is, as every one knows, *pearl-grey*, the *legs and feet* being *flesh-coloured*; and the *ring outside the eye is of a pale yellow*. Taking

these as the characteristics to distinguish it from its congeners, its range may be defined as the north-west of Europe from the Varanger Fiord, the Baltic, the western coasts down to North Africa, the Azores (where it breeds), Madeira, and the Canaries (*Godman*). To Greenland it is a very rare straggler; but it was obtained at Winter Islands, near Melville Peninsula, occurs in Hudson's-Bay territory as far as the Mackenzie River, and probably reaches right across to the Pacific coast, where it certainly occurs, a specimen from Kodiak, collected by Wosnesensky, in the St.-Petersburg Museum, being, as Mr. Seebohm informs me, much lighter in the mantle than *L. cachinnans*; and several specimens from the west coast of Mexico are in my collection. Dall and Bannister also record what seems to be this species from Alaska and from the Upper Yukon. There can be no doubt that examples from northern latitudes have a somewhat lighter mantle than those from more temperate regions, although the transition is very gradual; and this light form has received the name of *L. argentatoides*. From Labrador this species ranges down the coast and along the great rivers and inland lakes as far as Texas; it also visits Cuba and Bermudas. Prof. Barboza du Bocage, in his "List of Birds in the Lisbon Museum" (J. f. Orn. 1876, p. 291), cites an example obtained on the Angola coast, and another at Porto Alexandre, Benguela, more than 15° *south* of the equator, and in the latitude of the island of St. Helena. This is indeed an extension of its range, provided there is no error in the identification of the specimens.

8. Larus cachinnans, Pall.

Larus cachinnans, Pallas, Zoogr. Ross.-As. ii. p. 318 (1811).

Larus argentatus, Bp. Iconogr. F. Ital. Uccelli, Introd. (1832–41); Middend. Sib. Reise ii. p. 242 (part.), (1853); Schlegel, Mus. Pays-Bas, *Lari*, p. 17 (part.), 1863; Blasius, J. f. Orn. 1865, p. 380 (part.): Hume, Yarkand Exp. Zool. p. 299 (1873), Kashmir; id. Stray Feath. i. p. 270 (1873), Scinde.

Larus cachinnans, Pall.; v. der Mühle, Orn. Griechenl. p. 143 (1842).

Glaucus leucophæus, (Licht.) Bruch, J. f. Orn. 1853, p. 101 (Red Sea).

Glaucus michahellesii, Bruch, *tom. cit.* p. 101.

"*Glaucus borealis*, Brandt," Bruch, *tom. cit.* p. 101.

Laroides michahellesii, Bruch, *op. cit.* 1855, p. 282.

Laroides cachinnans, (Pall.), Bruch, *tom. cit.* p. 282.

"*Laroides borealis*, (Brandt)" Bruch, *tom. cit.* p. 282.

Larus epargyrus, Licht. Nomencl. Av. Mus. Berol. p. 99 (1854), sine descr. (type examined, H. S.).

Larus leucophæus, Licht. Nomencl. Av. Mus. Berol. p. 99 (1854), descr. nulla (type examined, H. S.); Salvadori, Cat. Ucc. Sard. p. 129 (1864); Finsch & Hartl. Vög. Ost-Afrik. p. 818 (1870); Dresser, B. of Europe, pt. xxii. (Oct. 1873).

Laroides leucophæus, Bp. Naumannia, 1854, p. 212; id. Consp. ii. p. 219 (1857).

Larus fuscescens, Sclater, P. Z. S. 1867, p. 315, et Rev. List of Vert. (1872), p. 316.

? *Larus fuscescens*, Licht.; Bruch, J. f. Orn. 1853, p. 100, (part.). One of the two specimens so labelled in the Berlin Museum is of this species; the other is a *L. fuscus*.

After much consideration and the examination of a very large series of specimens from various localities, I have come to the conclusion that this form, or species, is sufficiently distinct to be treated apart from *L. argentatus*. The distinguishing characteristics of *L. cachinnans* are the *darker* mantle, *yellow* legs and feet, and the *deep orange-red* ring round the outside of the eye. These colours are naturally much more apparent in life than in dried skins; but the colour of the mantle is enough to enable any one with an ordinary perception of shades to separate the two birds at a glance. In the *pattern* of the primaries, and in the individual variations in size both are alike. With regard to the name which I have adopted, it seems to me that there cannot be the slightest doubt as to the species Pallas meant by his *Larus cachinnans* from the Caspian and the Steppes: he describes it fully; and, to avoid any ambiguity as to the shade of colour of the mantle, he uses precisely the same term that he does for the mantle of *L. ichthyaëtus*, which exactly suits this species, whilst it is too dark for *L. argentatus*, and too light for *L. affinis*. Yet more, my friend Mr. Seebohm, on his return from Siberia, examined the *Larinæ* in the St.-Petersburg Museum; and, thanks to him, I am able to state from absolute comparison that *L. cachinnans*, and *L. leucophæus* of the Mediterranean are the same, Pallas's name having the priority.

It appears, indeed, to be a form which, whether from living in a more brilliant atmosphere, or from frequenting inland seas as distinct from great oceans, or from other causes with which we are not acquainted, has acquired a greater intensity of coloration than its congener; but it is not altogether easy to indicate its precise range. The most northern example that I have examined is from Havre, an adult male, the oldest, to judge by the primaries, of any grey-backed gull in my collection; so that it appears to straggle up the French coast. It is not, however, till the Mediterranean is reached that *L. cachinnans* replaces *L. argentatus*; thence it ranges throughout that inland sea, breeding on its shores and islands; goes up the Black Sea, across the steppes and the low-lying marshy and salt-lake districts of Russia from the mouths of the Volga and the shores of the Caspian, as far as Vologda, across the Ural river and the Kirgish steppes, to the Irtich and as far as Lake Baikal. The above seems to be, roughly, its breeding-range; for Meves's description of the "*L. cachinnans*" obtained at Cholmogory on the Dwina applies better to the next species: it was so dark in the mantle that he at first took it to be *L. fuscus*. The species found in Kashmir by the Yarkand expedition was probably *L. cachinnans*. It goes down the Red Sea, and in winter visits the Persian Gulf, and the Mekran coast as far as Kurrachee. It is also found along the coasts of China and Japan in winter, and is the species recorded by Swinhoe under the

names of *L. cachinnans* and *L. occidentalis*; but his birds are most decidedly not the true *L. occidentalis* of Audubon, which has never as yet been obtained anywhere on the Asiatic shores. All Asiatic birds show very distinctly the grey wedge in the outer primaries, which *L. occidentalis* never does: besides, their mantles are not nearly dark enough for that species. I possess, or have examined, a large series of specimens from almost all the localities I have indicated, and have taken very little from descriptions; indeed it is necessary to rely in this matter on one's own observations, as the confusion respecting this group is inconceivable to any one who has not studied the question. In Japanese and Chinese specimens, all obtained in winter, my collection is especially rich, owing to the efforts of Capt. St. John, of H.M.S. 'Sylvia,' and Lieut. Stanley Muggeridge, of H.M.S. 'Kestrel;' Professor Taczanowski has sent me specimens from Lake Baikal, and Mr. W. Muloch and Mr. Blanford examples from Kurrachee and the Mekran coast, whilst as regards Russia and the Mediterranean Mr. Seebohm's and other collections have been available. I may observe that I think it quite possible that in individuals from more northern localities the feet may not be so distinctly *yellow* as in examples breeding in the Mediterranean, believing, as I do, that certain atmospheric conditions exercise a considerable effect upon coloration.

9. Larus affinis, Reinh.

Larus affinis, Reinhardt, Vidensk. Meddel. 1853, p. 78, et Ibis, 1861, p. 17 (type examined, H. S.); Seebohm and H. Brown, Ibis, 1876, p. 452.

Larus argentatus (partim), Midd. Sib. Reise, ii. p. 242. (The description of the bird from Sea of Okhotsk clearly applies to this species.)

Larus cachinnans, Licht. Nomencl. Av. Mus. Berol. p. 99, nec Pallas (specimens examined, H. S.).

Larus fuscus, Jerdon, B. of India, ii. p. 830 (1864).

Larus cachinnans, Meves, Öfv. k. Vetensk. Ak. Förh. 1871, p. 786 (Cholmogory); Heugl. Orn. N.O.-Afr. Bd. 2. Abth. ii. p. 1392 (nec Pallas).

Larus, sp.? No. 39, Heuglin (nec Pallas), Ibis, 1872, p. 65 (Novaya Zemlia and Waigats): description can only apply to this species.

Larus occidentalis, Hume, Stray Feath. 1873, p. 273 (nec Audub.).

Larus heuglini, Bree, B. Eur. 2nd ed. v. p. 58 (1876).

Professor J. Reinhardt, of Copenhagen, was the first to discriminate and to confer a name upon an individual of this species which had straggled to Greenland; but for a knowledge of its habitat and distribution we are indebted to Messrs. Seebohm and Harvie Brown, who found it breeding upon the Petchora, where, however, it only comes about 11th May, and retires southward on the approach of winter. The series of specimens brought home by these energetic naturalists threw a light upon many points which had hitherto been obscure, and showed the real position of numerous specimens from

the Red Sea and the Beloochistan coast, which had formerly been a great trouble, most of them being in immature plumage, and not suiting either *L. cachinnans* or *L. fuscus*.

Mr. Hume's description of the pattern of the primaries of the birds found in winter about Kurrachee (Stray Feathers, 1873, p. 273) shows clearly that his *L. occidentalis* is this species, and by no means the true American bird, the occurrence of which, as I have said before, has never yet been authenticated on the coasts of Asia.

Heuglin's dark-mantled bird from Novaya Zemlia is clearly *L. affinis*; and Middendorff's description of a variety of *L. argentatus* found round the southern shores of the Sea of Okhotsk also applies to this species.

It may appear strange at first sight that this species should have been first described from Greenland; but that is merely due to the unusually careful attention which the fauna of that country has received from Dr. Reinhardt, whose watchful eyes not even a straggler could escape. I have examined the type, and am satisfied that it is of this species. It connects with *L. fuscus* rather closely (although quite distinct) in the length of its foot as compared with that of the tarsus, it having a proportionally smaller foot than either *L. argentatus*, *L. cachinnans*, or *L. occidentalis*, but larger than *L. fuscus*. From the last it may also be distinguished by its larger size and the distinct "pattern" of the outer primaries, the grey wedge being quite marked in this species, whilst it is absent in the outer feather of *L. fuscus*. The mirror on the second primary is moreover only to be found in very old birds (not one of thirteen breeding-birds obtained on the Petchora had it); whilst in old *L. fuscus* this mirror is always present. The present species is in fact a Herring-Gull which passes the whole of the year in a brilliant atmosphere; and I cannot help thinking that to this, and to other conditions of existence with which we are as yet unacquainted, its intensity of coloration is mainly attributable.

10. Larus occidentalis, Audubon.

Larus occidentalis, Aud. Orn. Biogr. v. p. 320 (1839); Lawr. B. of N. Am. p. 845 (1858); Elliot, B. N. Am. ii. pl. lii.; Coues, P. Ac. N. S. Philad. 1862, p. 296; Schl. M. P.-Bas, *Lari*, p. 15 (1863).

Glaucus occidentalis, Bruch, J. f. Orn. 1853, p. 101.

Laroides occidentalis, id. *op. cit.* 1855, p. 282; Bp. Consp. Av. ii. p. 219 (1857).

Larus argentatus, var. *occidentalis*, Coues, Key N. Am. Birds, p. 312 (1872); id. B. of N.W. Am. p. 633 (1874).

Larus fuscus?, Saund. P. Z. S. 1875, p. 158 (Lower California).

Hab. Pacific coast of North America down to Magdalena Bay, Lower California.

It seems to me that this is a very recognizable form, and fully deserving of consideration as a species. Its nearest ally is, on the whole, *L. affinis*; but in the wing-pattern the grey wedge is absent in

the two outer primaries; and their ground-colour is rather darker than in most examples of *L. fuscus*. In the colour of the mantle many specimens are quite as dark as *L. fuscus*, especially those from Southern California, one of which I should have referred to that species but for its long coarse foot; for at that time I had only northern specimens of *L. occidentalis* available, and these are considerably lighter on the mantle and in general tint. Since then I have had the opportunity of inspecting more examples and of knowing the species better; and it seems to me that its *large deep bill* will generally, and its *large coarse foot, longer than the tarsus*, will always, suffice to separate it from *L. fuscus*, which has a delicate foot, much shorter than the tarsus. As a rule *L. occidentalis* is a stouter bird; but some males of *L. fuscus* from the south of Europe run very long in the wing and as large in the bill, whilst on the other hand the Magdalena-Bay *L. occidentalis* is a female, and has an unusually slender bill. In one example I have found a tiny subapical spot on the second primary on one side, but not on the other; so that it is probably a mark of extreme age; but in fully adult *L. fuscus* this is common. Although I have laid stress upon the characters which distinguish this Gull from *L. fuscus*, yet it is rather more closely related to the Herring-Gull group, as shown by its generally larger size, stout bill, and large feet, which are flesh-coloured in this species, although, as in many other cases, they are sometimes rather yellow when dried.

11. Larus fuscus, Linn.

Larus fuscus, Linn. Syst. Nat. i. p. 225 (1766); Scop. Ann. i. Hist. Nat. p. 80 (1769); Gmel. Syst. Nat. i. p. 599 (1788); Lath. Ind. Orn. p. 815 (1790); Temm. Man. d'Orn. p. 496 (1815); Schl. M. Pays-Bas, *Lari*, p. 15 (1863); Finsch & Hartl. Vög. Ost-Afr. p. 820 (1870); Sharpe and Dresser, B. of Europe, pt. xvi. (February 1873).

Larus flavipes, Meyer, Tasch. Vög. Deutschl. ii. p. 469, pl. front. (1810).

Larus cinereus, Leach, Syst. Cat. Mamm. &c., Brit. Mus. p. 401 (1816).

"*Larus argentatus*, Mont." Bewick, Brit. B. Supp. p. 39 (1821).

Leucus fuscus, Kaup, Natürl. Syst. pp. 86 and 196 (1829).

Laroides melanotos, *harengorum* et *fuscus*, Brehm, Vög. Deutschl. pp. 747–749 (1831).

Dominicanus fuscescens (Licht.) partim, Bruch, J. f. Orn. 1853, p. 100. Lichtenstein's example from Arabia is this species; the other bearing this name is *L. cachinnans* (specimens examined, H. S.).

Dominicanus fuscus (Linn.), Bruch, J. f. Orn. 1853, p. 100; id. *op. cit.* 1855, p. 281, including his *L. fuscescens* of 1853.

Clupeilarus fuscus, Bonap. Consp. Av. ii. p. 220 (1857).

"*Larus medius*, Hempr. & Ehr." in Mus. Berol. "Gumfudde." An immature specimen of this species, H. S.

Hab. The north of Europe, the Faroes, the Baltic, Russia as far east as Archangel, the British Islands, the French coast, and the

Canaries (probably its south-west breeding-limit, although it is known to go as far south as Senegal, whence I have examined specimens obtained in May). It visits the Portuguese and Spanish coasts, goes up the Mediterranean to the Black Sea, ascends the Nile to Nubia, and is found throughout the Nile country, whilst on the Red Sea, as far as Aden, it is stated to be sedentary (*Finsch & Hartlaub*). Jerdon's solitary immature specimen procured at Jaulna, in the Deccan, was probably *L. affinis*, the length of the wing (18 to 19 inches) being greater than that of any *L. fuscus* I ever saw, $17\frac{1}{4}$ inches being the very extreme for an old and fresh-moulted bird; and, indeed, Mr. Dresser gives only 15·7! Mr. Dresser states that Dybowski found it in Dauria; but Prof. Taczanowski, in his "Faune de la Sibérie Orientale" (Bull. Soc. Zool. de France, i.) does not mention it amongst that traveller's collection; and with regard to the quotation by the above author of Mr. Swinhoe's authority for its occurrence on the coast of China, a reference to the revised "List of the Birds of China," P. Z. S. 1871, p. 421. no. 656, shows that the species referred to ('Ibis,' 1860, p. 68) as *L. fuscus* was really *L. crassirostris*, Vieill. (*L. melanurus*, Temm.), thus considerably circumscribing the eastern range attributed to it. As regards America, Dr. Coues considers that there is no good evidence of its occurrence on the coasts of the United States.

The distinguishing characteristics of the adult of this species are its dark slate-coloured mantle, chrome-yellow legs and feet, and the shortness of the foot as compared with the tarsus. The outer primaries are very dark, and may be termed black, with a subapical patch or mirror on the first; and in *old* birds there is a *small* mirror on the second primary; but even in these there is *no sign* of the *grey wedge* on the *upper part* of the *inner web* of the *outermost*, scarcely so on the second, and but rarely even on the third—a marked difference from the *L. argentatus* group. In *L. fuscus* the inner web merely fades into a lighter shade towards the edge; and this dark ground of the primaries, and the absence of distinct "pattern," coupled with its average smaller size, and especially the smaller foot, will generally be sufficient to distinguish it from either *L. affinis* or *L. occidentalis*. But for the large coarse foot, I should have assigned a specimen of *L. occidentalis*, from Magdalena Bay, California, to this species; for at the time I had never seen so dark a form of the American bird. In shade of mantle there is much variation, some being in this respect quite as light as *L. affinis*, whilst the blackest are Egyptian specimens, in which the yellow feet are also brightest, probably due to climatic influences. These very dark birds when old have certainly a white subapical spot on the second primary, although Blasius imagined that this was confined to northern and lighter-mantled birds. The examples which run closest to *L. affinis* are some from Malaga and Tangiers, two of which I have with the subapical spot on the second primary, showing considerable age; but even with these the difference between them and *L. affinis* is very marked, *L. affinis* having the grey wedge so much more defined. The adults, therefore, are quite distinguishable; but some years ago,

before Messrs. Seebohm and Harvie Brown's explorations on the Petchora had made me acquainted with a series of *L. affinis*, I was much puzzled by Mr. W. Blanford's immature birds from the Baluchistan coast, obtained in December 1871 to January 1872, and I led him into the error of ascribing them to *L. fuscus*. By my note-book of specimens examined I find that I was in much doubt even at that time, owing to their size and the relative dimensions of the feet and tarsi; but according to my lights I could then ascribe them to nothing else. I now consider them to have been *L. affinis*.

12. LARUS CALIFORNICUS, Lawr.

? *Larus niveus*, Pall. Zoogr. Rosso-As. ii. p. 320, pl. 86 (1811), (Kamtschatka), nec Bodd. T. Pl. Enl. 994 (1783).

? *Laroides americanus*, Brehm, Vög. Deutschl. p. 743 (1831).

Larus californicus, Lawr. Ann. Lyc. New York, vi. 1854, p. 79; id. Birds N. Am. p. 846 (1858); Coues, Pr. Ac. N. S. Phil. 1862, p. 300; id. B. of N.W. Am. p. 634 (1874).

Laroides californicus, Bp. Consp. Av. ii. p. 220 (1857).

Larus delawarensis, var. *californicus*, Coues, Key N.-Am. B. p. 313 (1872).

Hab. Pacific coast of North America from Vancouver's Island to Lower California, and the interior as far as the vicinity of Great Slave Lake; also Japan coast, whence I have examined an adult specimen in the Marquis of Tweeddale's collection, obtained by Capt. St. John, H.M.S. 'Sylvia,' off Kali, Japan, in January 1872.

The name *L. niveus*, Pallas, is not available, having been previously employed by Boddaert for *Pagophila eburnea*; but I have long been of opinion that the bird described by Pallas under that name was really this species—a conviction strengthened by the sight of an undoubted example from Japan, proving that it does cross the North Pacific. It has generally been supposed to apply to a larger race of *L. canus*; but Pallas knew *L. canus* perfectly well, and he describes his *L. niveus* as a somewhat *scarce* visitor to the northern and Kamtschatkan seas, and not in the habit of going far up the rivers, also as "magnitudo corvi coracis." Now the largest *L. canus* could hardly be described as of the size of a Raven; and, except in the wing, which is proportionally long in that Gull, the other measurements are too large for it; but they exactly suit *L. californicus*, and Pallas's figure is a perfect portrait of a specimen recently sent to me through the kindness of the authorities of the Smithsonian Institution. Perhaps these remarks may assist in laying the ghost of that *Larus niveus* which for nearly a century has been haunting the lists of systematists.

Dr. Coues inserts with a ? *L. argentatoides*, Bonap. Synopsis, Ann. Lyc. Nat. Hist. New York, p. 360 (1828), as the earliest name for this species, whilst disavowing any desire to supersede Lawrence's title; but as the name had already been applied by Brehm in 1822 for *L. argentatus*, it could not be used for this species, even if correct. But Bonaparte says of his species:—"Common near New York and

Philadelphia; we have also shot it on the southern coasts of England." Now I am not aware of this species having been found within 2000 miles of New York; and the description and measurement (20 inches in length) suit *L. delawarensis*, the length of which Dr. Coues gives as 19·75 inches, better than any other. Dr. Coues goes on to identify *L. argentatoides* of Richardson with Bonaparte's species: but this cannot be; for Richardson's birds were from 23 to 25 inches in length, with a mantle of the same shade as the Iceland Gull—both too large and too light for *L. californicus*. Richardson got his bird at Melville Peninsula, and speaks of it as found at Hudson's Bay. Dr. Coues says the Smithsonian Institution possesses specimens "from localities not far distant from those of Richardson;" but it seems to me that Great Slave Lake is a very considerable distance from Melville Peninsula, although nearer to it than to New York. Dr. Coues gives the length of *L. californicus* as 20 inches; and as Richardson's 23 to 25 inches do not suit him, he quite gratuitously suggests that Richardson drew up his measurements from the largest specimens; whilst as for the colour of the legs, which are described as "flesh-coloured," whereas in *L. californicus* they are olivaceous, his assumption is that Richardson described them from dried skins! There can be very little doubt that Richardson's birds were examples of *L. argentatus*; for his measurements and descriptions suit that species better than any other.

I am glad to see that Dr. Coues, in his 'Birds of North-West America,' has reconsidered his previous hasty determination that this species was merely a large variety of *L. delawarensis*. To judge from the examples I have examined, *L. californicus*, although certainly the connecting-link between the *L. argentatus* and the *L. canus* group, is perfectly distinct from either. In the pattern of the primaries it rather goes with *L. argentatus*, in the colour of the soft parts with *L. delawarensis*; in the colour of the mantle it is much darker than either, though not so dark as *L. occidentalis*.

13. Larus delawarensis, Ord.

Larus delawarensis, Ord, Guthrie's Geogr., 2nd Am. ed., ii. p. 319 (1815) *fide* Lawr. B. N. Am. p. 846 (1858); Coues, B. of North-West Am. p. 636 (1874); Wheeler, Rep. Exp. and Surv. W. of 100th Mer. p. 485 (1876); Reid, Zoologist, 1877, p. 489 (Bermudas).

Larus canus, Bp. Specchio Comp. p. 69 (1827), nec auctt.

? "*Larus argentatoides*, Brehm," Bp. Synopsis, p. 360 (1828), nec Brehm.

Larus zonorhynchus, Richardson, F. Bor.-Am. ii. p. 421 (1831); Audubon, B. Am. viii. p. 35, pl. 446 (1839); Schlegel, Mus. P.-Bas, *Lari*, vi. p. 22 (1863); Blasius, J. f. Orn. 1865, p. 380; Bp. Consp. Av. ii. p. 224 (1857); Gundlach, J. f. Orn. 1857, p. 236 (Cuba).

Glaucus zonorhynchus (Rich.), Bruch, J. f. Orn. 1853, p. 102.

"*Glaucus occidentalis* (Audub.)," Bruch, J. f. Orn. 1853, p. 101, taf. ii. fig. 20, nec Audubon.

Gavina zonorhynchus (Richards.), Bp. Naum. 1854, p. 212; Bruch, J. f. Orn. 1855, p. 282.

Gavina bruchi, Bp. Naumann. 1854, p. 212; Bruch, J. f. Orn. 1855, p. 283.

"*Laroides occidentalis* (Audub.)," Bruch, J. f. Orn. 1855, p. 282, nec Audubon

Larus zonorhynchus, var. *mexicanus* et var. *bruchi*, Bp. Consp. Av. ii. p. 224 (1857).

Hab. Interior and coasts of North America from the Saskatchewan and Labrador to Great Salt Lake (breeding), and in winter to the middle and southern States, Cuba, and the Bermudas. An immature bird in my collection obtained by Mr. H. Whitely at Hakodadi, Japan, 14th December, 1864, seems from its size and stout barred bill to belong to this species.

The adult is easily distinguished from *L. canus* by its larger size, stout, double-zoned bill, and lighter mantle; it is smaller than *L. californicus*, its wing-pattern is different, and the mantle is much lighter.

14. LARUS CANUS, Linn.

Larus canus, Linn. Syst. Nat. i. p. 224 (1766); Gm. Syst. Nat. i. p. 596 (1788); Schl. Mus. P.-Bas. *Lari*, p. 23 (1863); Sharpe & Dresser, B. of Eur. pt. xvii. (1873); David & Oust. Ois. de la Chine, p. 517 (1877).

Larus cinereus, Scop. Ann. i. Hist. Nat. p. 80 (1769).

Larus hybernus, Gm. Syst. Nat. i. p. 596 (1788).

Larus procellosus, Bechst. Orn. Tasch. p. 373 (1802).

Larus cyanorhynchus, Meyer, Tasch. Vög. Deutschl. ii. p. 480 (1810).

Laroides procellosus et *L. canescens*, Brehm, Vög. Deutschl. pp. 750–753 (1831).

Larus canus, var. *major*, Middendorff, Sib. Reise, ii. p. 243 (1853).

Larus heinei, Homeyer, Naumannia, 1853, p. 129.

Glaucus canus, Bruch, J. f. Orn. 1853, p. 102.

"*Glaucus lacrymosus* (Licht.)," Bruch, J. f. Orn. 1853, p. 102, nec Licht.

Gavina kamtschatchensis, Bp. Naumannia, 1854, p. 212.

Gavina heinei, Bruch, J. f. Orn. 1855, p. 283.

Gavina canus, id. *op. cit.* p. 284.

? *Rissa nivea*, Bp. Cat. Parzudaki, p. 11 (1855).

"*Larus niveus*, Pall," Bp. Consp. Av. ii. p. 224 (1857); Swinhoe, P. Z. S. 1871, p. 420; David & Oust. Ois. de la Chine, p. 518, 1877, nec Pallas.

Larus delawarensis, Coues, Pr. Ac. N. Sc. Phil. 1861, p. 246.

Larus canus major, Schl. Mus. P.-Bas, *Lari*, p. 26 (1863).

"*Larus suckleyi*, Lawr." Schl. M. P.-Bas, *Lari*, p. 27 (1863), nec Lawr. (Japan).

Larus audouini, Tristram, Ibis, 1868, p. 330, nec Payr.

Hab. Throughout the Palæarctic region, but very rare in Iceland; once in Labrador.

A specimen bearing the label of the Labrador Expedition of Dr. E. Coues and Mr. J. W. Dodge in 1860, obtained at Henley Harbour on the 21st August, and marked *L. delawarensis*, came into my hands indirectly from Mr. Krider, of Philadelphia. I have very little doubt as to its being really *L. canus*; but the American naturalists will have an opportunity of disputing or confirming my view, as I have sent it to the Smithsonian Institution.

Few species differ so much in individual size as *L. canus*; and I cannot admit the specific validity of the large race found throughout Northern Russia and Siberia. Off Japan all sizes are found; and the colour of the mantle is also very variable, being lightest in Scotch breeding-birds. It appears to be a species which attains its greatest development in the north and east, and deteriorates in size as it ranges south and west. I have already pointed out that I consider *L. niveus* of Pallas to be really the earliest name of *L. californicus*, Lawr.

15. Larus brachyrhynchus, Rich.

Larus canus, Richardson, F. Bor.-Am. ii. p. 420 (1831), nec Linn. nec auctt. (adult).

Larus brachyrhynchus, Rich. F. Bor.-Am. ii. p. 421 (1831), juv. (nec Gould, P. Z. S. 1843), type described, Great Bear Lake, May 23rd, 1826; Coues, P. Ac. N. S. Philad. 1862, p. 302; Elliot, B. N. Am. ii. pl. 53; Dall & Bann. Tr. Ch. Ac. 1869, p. 305.

Larus suckleyi, Lawr. Ann. Lyc. New York, 1854, p. 264; id. B. N. Am. p. 847 (1858); Schl. M. P.-Bas, *Lari*, p. 27 (1863).

Rissa septentrionalis, Lawr. Ann. Lyc. New York, 1854, p. 266; id. B. N. Am. p. 854 (1858).

Larus canus, var. *brachyrhynchus*, Coues, Key N. Am. B. p. 313 (1872); id. B. N. W. Am. p. 638 (1874).

Hab. North-Pacific coast of America, from Sitka downwards, and the interior to Great Bear Lake.

I can refer to no other species the specimens obtained by the late Mr. Hepburn at San Mateo, California, and one very old and fresh-moulted bird in the Copenhagen Museum from Sitka. They are certainly not *L. delawarensis*; and they are smaller than any *L. canus* in my collection except one, a quite abnormally small female from Orkney. The bill is slender and weak; and the foot with the middle toe and nail is nearly as long as the tarsus, which in *L. canus* is considerably longer. The bill is olive-green to mandible, in front of which it is yellow, the former colour being much more predominant than in old *L. canus*. There is much more grey from the base of the primaries downwards than in *L. canus*; and on the third primary the wedge descends to the level of the tip of the fifth primary, whilst there is a broad subapical mirror on the third primary, which, again, is seldom, if ever, the case in *L. canus*; also the ends of the primaries are much more broadly tipped with white.

So far, I think, I am in accord with Dr. Coues, who has had the advantage of examining Richardson's type, which, however, is a young bird; but as regards the adult, of which he has seen far more

examples than I have, there is a slight discrepancy to be explained. He says that the colour of the mantle of *L. brachyrhynchus* is rather *lighter* than in *L. canus*; my specimens are certainly rather *darker* than the darkest *L. canus*. Perhaps this is a slip of the pen, or an inversion of his reference; otherwise I cannot understand it. I retain this species as it has already been described, because the specimens before me have a general appearance so different from *L. canus* that they are distinguishable at a glance, although it is rather difficult to define the differences on paper; but I expect that a larger series will throw light upon the subject. Schlegel's bird from Japan assigned to this species seems to me to be merely a large *L. canus*.

16. Larus audouini, Payr.

? *Larus quadricolor*, Scop. Ann. i. Hist. Nat. p. 81. no. 109 (1769).

Larus audouini, Payraudeau, Ann. Sc. Nat. viii. p. 462 (1826); Temm. Pl. Col. livr. 81, pl. 480 (1826); Gould, B. Europe, v. pl. 438 (1837); Schl. M. P.-Bas, *Lari*, p. 22 (1863); Degl. & Gerbe, Orn. Europ. ii. p. 420 (1867); Lilford, Ibis, 1875, p. 31.

Larus payraudei, Vieill. Faun. Franç. Ois. p. 396 (1828), fide Deg. & Gerbe, *loc. cit.*

Gavia audouinii (Payr.), Boie, Isis, 1844, p. 191.

Glaucus audouini (Payr.), Bruch, J. f. Orn. 1853, p. 102.

Gavina audouini (Payr.), Bp. Naum. 1854, p. 212; Consp. Av. ii. p. 222 (1857).

Laroides audouini (Payr.), Bruch, J. f. Orn. 1855, p. 282; Brehm, Naum. 1855, p. 294.

Hab. Mediterranean, especially about Corsica and Sardinia, and the neighbouring coasts of Italy, the Balearic Islands, and North Africa. Mr. Gould quotes Natterer (*in litt.*) as having shot three specimens outside the Straits of Gibraltar, between that place and Tarifa. Lord Lilford found it breeding on the island of Toro, off Sardinia. Canon Tristram's reputed *L. audouini* from Palestine are all *L. canus*.

This Gull is one of the most unmistakable species, owing to its length of wing, dark primaries, lead-coloured or black legs, and, when adult, its cherry-red double-zoned bill. From the description given by Scopoli of his *L. quadricolor* it is probable that it is this species; but in the absence of certainty it is undesirable to use that name.

17. Larus marinus, Linn.

Larus marinus, Linn. Syst. Nat. i. p. 225 (1766); O. Fabr. Faun. Grœnl. p. 102 (1780); Meyer, Tasch. Vög. Deutschl. pl. ii. p. 465; Temm. Man. d'Orn. p. 490 (1815); Macgill. M. Wern. Soc. vol. v. p. 255 (1824); Schlegel, M. Pays-Bas, *Lari*, p. 10 (1863); Sharpe and Dresser, B. of Eur. pt. xv. (1872); Coues, B. of North-West (America), p. 624 (1874); Swinhoe, Ibis, 1874, p. 165 (Japan); Reid, Zoologist, 1877, p. 489 (Bermudas).

Larus nævius, Linn. Syst. Nat. p. 225 (1766).

Larus maculatus, Bodd. Tab. Pl. Enl. p. 16 (1783).

Larus maximus, Leach, Syst. Cat. Brit. Mus. p. 40 (1816); Brehm, Vög. Deutschl. p. 728 (1831).

Leucus marinus, Kaup, Natürl. Syst. pp. 86, 196 (1829).

Larus mülleri, Brehm, op. cit. p. 729 (1831).

Larus fabricii, id. op. cit. p. 730 (1831).

Dominicanus marinus, Bruch, J. f. Orn. 1853, p. 100; id. ib. 1855, p. 280.

Larus albus, P. L. S. Müller, Natursystem, p. 108 (1776), has generally been quoted by copyists as a synonym of this species; but investigation shows that it is based upon Buffon's "Mouette cendrée tachetée" (vol. vii. p. 424; Pl. Enl. 387), which represents a young *Rissa tridactyla*.

Hab. Northern and temperate Europe and Iceland (breeding); visiting the Mediterranean in winter, as far as Greece; the Canaries, and probably the Azores. In Northern Greenland Prof. Reinhardt assures me that it is very rare; it breeds in Labrador, occurs on the great lakes of North America, and visits Florida in winter. Lembeye's specimen, recorded from Cuba, turned out to be *L. argentatus* (vide J. f. Orn. 1871, p. 290); but it has occurred at the Bermudas (*Reid*). No record from the American side of the Pacific; but I have examined undoubted specimens from Japan collected by Capt. Blakiston. This is a very great extension of its previously known range.

18. Larus dominicanus, Licht.

Larus dominicanus, Licht. Verz. Doubl. p. 82 (1823); Darwin, Zool. "Beagle," Birds, p. 142 (1841); Cassin, Orn. U.S. Expl. Exp. p. 377 (1858), Callao?; Schlegel, M. P.-Bas, *Lari*, p. 12 (1863); Layard, B. S. Africa, p. 367 (1867); Durnford, Ibis, 1877, p. 45 (Chuput, Patagonia); id. tom. cit. p. 201 (prov. B. Ayres).

Larus littoreus, Forster, Descr. Anim. p. 46 (1844), Cape of Good Hope.

Larus antipodus, Gray, Cat. *Anseres* Brit. Mus. p. 169 (1844), New Zealand.

Dominicanus antipodus, Bruch, J. f. Orn. 1853, p. 100.

"*Dominicanus pelagicus* Anglor.," Bruch, J. f. Orn. 1853, p. 100 (India and Oceania); id. op. cit. 1855, p. 280; Bp. Consp. Av. ii. p. 214 (1857).

Dominicanus vetula, Bruch, J. f. Orn. 1853, p. 100, 1855, p. 281 (Cape Good Hope); Bp. Consp. Av. ii. 214 (1857).

"*Dominicanus vociferus* Anglor.," Bruch, J. f. Orn. 1853, p. 100, 1855, p. 281 (South America).

Dominicanus antipodum, Bruch, J. f. Orn. 1855, p. 281; Bp. Consp. Av. ii. p. 214 (1857).

Dominicanus fritzei, Bruch, J. f. Orn. 1855, p. 281 (Straits of Sunda, near Java?) (type in Wiesbaden Mus. examined, H. S.); Bp. Consp. Av. ii. p. 214 (1857).

Larus vociferus, Burm. Syst. Uebers. Th. Bras. p. 448 (1856); id. La Plata-Reise, ii. p. 518 (1861).

Clupeilarus antipodum, Bp. Compt. Rend. xlii. p. 770 (1856).
Larus verreauxii, Bp. Rev. et Mag. Zool. vii. 1855, p. 16.
Dominicanus verreauxii, Bp.; Bruch, J. f. Orn. 1855, p. 281(Chili).
Dominicanus azaræ (Less.), Bp. Consp. Av. ii. p. 214 (1857).
Lestris antarcticus (!), Ellman, Zool. 1861, p. 7472.
Lestris fuscus, id. Zool. 1861, p. 7472.
Larus vetula, Gurney, Andersson's B. Damara Land, p. 357 (1872); Shelley, Ibis, 1875, p. 86 (Natal).

Hab. New Zealand, Kerguelen Island, and the other islands between it and Cape of Good Hope, African coast to 22° S. lat., the opposite coast of South America, the Falkland Islands, Patagonia, the coast of Chili, and the island of Juan Fernandez. I am sceptical as to the locality assigned to *L. fritzei*, whilst equally unable to accept Bonaparte's version of Sunda being a mistake for Sund [Lund?] in Sweden!

In a large series of specimens from the above localities I can detect no specific differences, individuals from the same localities often varying quite as much in the dimensions of the bill as do those from widely remote places. The absence or presence of the white mirror near the tip of the first primary is of no specific value whatever, being entirely dependent upon the age of the individual; it does not appear till after the bird has assumed the full black mantle, and increases in size with age.

The deep *brown*-black of the mantle, as distinct from the *slate*-black of *L. fuscus*, and its strong bill and larger size, will distinguish *L. dominicanus* from that species; it is smaller than *L. marinus*, has a different pattern of primaries, and has *olivaceous-coloured* legs and feet.

Messrs. Sclater and Salvin state (P. Z. S. 1871, p. 576) that the examples then living in the Society's gardens had *flesh-coloured* legs and feet; but this is either a slip of the pen, or else they must have been looking at a *L. marinus*, the only "Black-back" which when adult has those parts of that colour.

19. Larus pacificus, Latham.

Larus pacificus, Latham, Suppl. Ind. Orn. p. 68 (1801); Gould, B. of Austral. vol. vii. pl. 19; Schlegel, M. P.-Bas, *Lari*, p. 7 (1863).
Larus frontalis, Vieillot, in Nouv. Dict. H. Nat. 2nd ed. t. xxi. p. 505 (1818), im. ad. (Tasmania).
Larus leucomelas, Vieillot, N. Dict. H. Nat. 2nd ed. t. xxi. p. 509 (1818), adult (Tasmania).
Larus bathyrinchus (sic), Macgill. Mem. Wern. Soc. v. (1823–4), p. 253.
Larus georgii, King, Surv. Intertrop. Australia, ii. p. 423 (1826) (King George's Sound, S.W. Australia).
Gabianus pacificus (Lath.), Bruch, J. f. Orn. 1853, p. 100, et 1855, p. 280; Bonap. J. f. Orn. 1854, p. 211; Rev. et Mag. Zool. 1855, p. 13; Consp. Av. ii. p. 212 (1857).

Gabianus bathyrhynchus, Bruch, J. f. Orn. 1855, p. 280; Bp. Consp. Av. ii. p. 212 (1857).

Gabianus georgii (King), Bp. Consp. Av. ii. p. 213 (1857).

Hab. South-west portions of Australia, Bass's Straits, and Tasmania; not included by Mr. Buller in his 'Birds of New Zealand,' but there are three specimens labelled from that locality in the British Museum, obtained by the Antarctic Expedition.

Mr. Gould's plate hardly gives a correct idea of the dimensions and great depth of bill in this fine species, which may easily be distinguished by this feature in all stages. In the adult the tail is crossed by a black band; and this peculiarity in the plumage, coupled with the stout bill, seems to place this species midway between the typical Gulls and those of the next group. The value of *Gabianus* as a genus for this species has been already discussed.

20. Larus belcheri, Vigors.

Larus belcheri, Vigors, Zool. Journ. iv. p. 358 (1829); id. Zool. Beecher's Voy. "Blossom," p. 39; Schlegel, M. P.-Bas, *Lari*, p. 9 (1863), excl. syns.; Scl. & Salv. P. Z. S. 1871, p. 575.

Adelarus belcheri, Bruch, J. f. Orn. 1853, p. 107; id. 1855, p. 279; Bp. Naum. p. 212 (1854).

Leucophæus belcheri, Bp. Consp. Av. ii. p. 232 (1857).

"*Larus fuliginosus*, Gould," Cassin, U.S. Expl. Exp. Orn. p. 378 (1858), nec Gould (Cape Horn to Callao).

Larus frobeenii, Phil. & Land. Wiegm. Archiv, 1861, p. 292.

Larus frobeni, iid. Cat. Aves Chil. An. Univ. Chil. tom. xxxi. p. 288.

Hab. West coast of S. America, from Callao southwards to Chili, the western portions of the Straits of Magellan, and down to Cape Horn.

I have the fully adult bird with pure white head and underparts from Chorillos, near Callao, Peru; but I observed the immature birds with dark hoods in far greater numbers. Although several of these Pacific Gulls have a hood in the immature stage, which is lost in the adult, in none of them is the change so remarkable as in this species. I confess that I cannot see any adequate reason for giving it generic rank; but Bonaparte thought differently, for he made it the type of his genus *Procellarus*, being quite unaware that it was absolutely the same *species* as the bird which he had already located in the genera *Leucophæus* and *Adelarus*!

Dr. Coues, in a general notice of American Gulls, under the head of *L. heermanni* (B. of N.W. p. 642), says that *L. belcheri* is "not a white-headed Gull at all," though he afterwards says that he should not be surprised if, in the adult state, it lost its hood. In this last surmise he is quite right; the adult *L. belcheri* is a perfectly white-headed Gull, at the first glance being like a stout *L. fuscus* with a black band on its tail.

21. Larus heermanni, Cassin.

Larus heermanni, Cassin, Proc. Ac. Nat. Sc. Philad. vi. p. 187

(1852); id. B. Californ. p. 28, pl. 5; Scl. & Salv. P. Z. S. 1871, p. 574; iid. Nomencl. Av. Neotrop. p. 148.

Adelarus heermanni, Bruch, J. f. Orn. 1853, p. 107, et 1855, p. 279.

Leucophæus heermanni, Bp. Naumannia, 1854, p. 211.

Blasipus heermanni, Bp. Consp. Av. ii. p. 211 (1857).

Larus (Blasipus) heermanni, Coues, B. N.W. Am. p. 641 (1874).

Hab. Pacific coast, from Vancouver's Island and California (breeding), down to Panama in winter.

The nearest ally of this species is perhaps *L. crassirostris* of the opposite Asiatic coast and islands; but its red bill and the lead-coloured neck and underparts will always serve to distinguish the adult; in *L. crassirostris* the neck and underparts are white.

22. Larus crassirostris, Vieill.

Larus crassirostris, Vieill. N. Dict. H. Nat. 2nd ed. p. 508 (1819), ex Krusenstern (Nagasaki, Japan); Schlegel, M. P.-Bas, *Lari*, p. 8 (1863); Swinh. P. Z. S. 1871, p. 421; David & Oust. Ois. de la Chine, p. 518 (1877).

Larus melanurus, Temm. Pl. Col. 77^{me} liv. pl. 459 (1828); Temm. & Schl. Faun. Japon. Aves, p. 132, pl. 88 (1850); Taczan. Bull. Soc. Zool. France, i. p. 264 (1876).

Adelarus melanurus, Bruch, J. f. Orn. 1853, p. 107, et 1855, p. 279.

Blasipus crassirostris, Bp. Naumannia, 1854, p. 211; id. Consp. Av. ii. p. 212 (1857).

Larus fuscus, Swinhoe, Ibis, 1860, p. 68 (nec Linn.).

Hab. Coasts of Japan and China, and large lakes and rivers of latter; breeding in colonies, generally on islands.

I have already pointed out roughly the distinctions between this species and *L. heermanni*; superficially the present bird is not unlike the adult of *L. belcheri*; but the mantle is much lighter, and the tail is white with a black bar, whereas in *L. belcheri* the greater portion of the tail is black.

23. Larus modestus, Tsch.

Larus modestus, Tschudi, Wiegm. Arch. 1843, pt. i. p. 389; id. Fauna Peruana, Aves, p. 306 (1845–6), pl. 35; Scl. & Salv. P. Z. S. 1871, p. 573; id. Nomencl. Av. Neotrop. p. 148 (1873).

Larus bridgesi, Fraser, P. Z. S. 1845, p. 16; id. Zool. Typ. t. 69 (1849), type in Brit. Mus.

Blasipus bridgesi (Fraser), Bruch, J. f. Orn. 1853, p. 108, et 1855, p. 280; Bp. Rev. Zool. 1855, p. 21; Consp. Av. ii. p. 212.

"*Blasipus polios* (Natt.)," Bp. Rev. Zool. 1855, p. 21; Consp. Av. ii. p. 212 (1857).

Leucophaius modestus, G. R. Gray, Hand-l. Birds, iii. p. 116 (1871).

Hab. Pacific coast of South America, from Callao to Valparaiso, and probably further south.

This species, which in its immature plumage bears an indication

of a dusky hood, has been confused with *L. fuliginosus* of the Galapagos Islands; but its much slenderer bill, tarsi, and feet will at once distinguish it from the latter, even in youth; whilst in the adult the clear grey of the underparts and the white blending into grey of the forehead and head, distinguish it from any other known species of Gull. Mr. Fraser's plate above cited gives a very fair idea of the adult; but *very old* birds are much lighter about the upper parts than his example.

24. Larus fuliginosus, Gould.

Larus fuliginosus, Gould, Zool. "Beagle," iii. p. 141 (1841); Scl. & Salv. P. Z. S. 1871, p. 573; Salvin, Trans. Zool. S. ix. p. 505, pl. lxxxvii.

Leucophæus fuliginosus et *Adelarus neptunus*, Bp. Rev. Zool. 1855, p. 20; et Consp. Av. ii. p. 232 (1857).

Procellarus heermanni! (part.), G. R. Gray, Hand-l. Birds, iii. p. 116 (1871).

Hab. Galapagos Islands.

This stoutly built and well-marked species appears to be restricted to the Galapagos group. Mr. Salvin's illustration above cited will probably prevent further confusion between this bird and *L. modestus*; but it is most extraordinary that the late Mr. G. R. Gray should have confounded it with *L. heermanni*, when he had the type of the present species before him. Specimens are exceedingly rare in collections; and of the eggs and nestlings no examples are known.

Although this species differs from the preceding ones in having a hood in its adult plumage, yet its other affinities seem to indicate that its proper place is here and not with the ordinary hooded Gulls.

25. Larus scoresbii, Trail.

Larus scoresbii, Trail, Mem. Wern. Soc. iv. p. 514 (1823), (New South Shetland Islands); Pelzeln, Orn. Novara Exp. p. 151; Abbott, Ibis, 1861, p. 165 (Falkland Islands).

Larus hæmatorhynchus, Vigors, in lett. King's Zool. Journ. iv p. 103 (1828–9); Jard. & Selby, Ill. Orn. ii. pl. 106; Gould, Zool. "Beagle," Birds, p. 142.

Leucophæus hæmatorhynchus, Bruch, J. f. Orn. 1853, p. 108, et 1855, p. 287; Bp. Naum. 1854, p. 211.

Procellarus neglectus, sive *Epitelarus neglectus*, Bp. Naumann. 1854, pp. 211, 213; id. Rev. et Mag. Zool. p. 13 (1855); id. Consp. Av. ii. p. 211 (1857), type and sole representative of *Procellarus*.

Leucophæus scoresbii, Bp. Consp. Av. ii. p. 231 (1857); Blasius, J. f. Orn. 1865, p. 378; Scl. & Salv. P. Z. S. 1871, p. 579; iid. Nomencl. Av. Neotrop. p. 148.

Larus scoresbyi, Schl. M. P.-Bas, *Lari*, p. 33 (1863).

Hab. Patagonia, east coast, south of about 45° S. lat., down to New South Shetland Islands, in about 63° S.; the Falkland Islands, the Straits of Magellan, and up the coast of Chili as far as Chiloe.

In spite of the somewhat peculiar shape of the bill in this species I hardly think it desirable to place it on that account in a distinct genus, especially as Bonaparte's genus *Leucophæus* also includes such dissimilar species as the present and *L. heermanni* of North America. His *Procellarus* is founded on a young bird of the same species! *Larus scoresbii*, however, is a very well-marked species, from its short, stout, crimson bill, and coarse legs and feet, the webs of the latter being a good deal incised. In the immature stage this bird has a sooty hood; but in the adult the upper parts are grey.

26. LARUS NOVÆ-HOLLANDIÆ, Steph. (Fig. 1.)

Larus novæ-hollandiæ, Stephens, Shaw's Gen. Zool. xiii. pt. i. p. 196 (1826), ex Latham.

Larus scopulinus, var. *major*, Forst. Descr. Anim. p. 106 (1844).

Fig. 1.

1. 2. 3.

Three outer primaries of *L. novæ-hollandiæ*, jr. (from the type of *Gavia pomarre*, Bruch, of 1853, not of 1855).

Larus jamesonii, Wilson, Ill. Zool. pl. xxiii. (1831).

Xema jamesonii, Gould, Birds of Australia, vol. vii. pl. xx (1848).

Gavia jamesonii, Wils. Bruch, J. f. Orn. 1853, p. 102; 1855, p. 285.

Gavia andersonii, Bruch, J. f. Orn. 1853, p. 102, et 1855, p. 285 (type examined, H. S.).

Gavia pomarre, Bruch, J. f. Orn. 1853, p. 103, not *Gavia pomare* of 1855, p. 285, which is *L. bulleri* (type in Mainz Mus. examined, H. S.), Society Islands.

Gelastes gouldi, Bp. Naumann. 1854, p. 216.

Gelastes corallinus, Bp. Naumann. 1854, pp. 212, 216 (type in Paris M. examined, H. S.).

Gelastes andersonii, Bp. tom. cit. p. 212.

Gavia gouldii, Bp. Bruch, J. f. Orn. 1855, p. 285.

Fig. 2.

1. 2. 3.

Three outer primaries of *L. novæ-hollandiæ*, ad. (from the type of *Gavia andersonii*, Bruch).

Bruchigavia gouldi, Bp. Consp. Av. ii. p. 228 (1857).

Bruchigavia pomare, Bp. tom. cit. p. 229.

Bruchigavia jamesonii, Bp. tom. cit. p. 228 (1857); Gould, Handb. B. Austral. ii. p. 387 (1865).

Bruchigavia corallinus, Bp. op. cit. p. 228 (1857).

Larus scopulinus major, Schlegel, M. P.-Bas, *Lari*, p. 29 (1863).

Hab. Australia from Raine Island, Torres Straits, to Bass's Straits, and Tasmania ; also New Caledonia, and perhaps the Society Islands.

Although very close to *L. scopulinus* of New Zealand, I think this species may fairly be distinguished by its larger size throughout, and by the greater amount of white mirror in the pattern of the three outer primaries. In old birds of *L. novæ-hollandiæ* there is always a mirror on the *third* primary as well as on the first and second; in a large series of *L. scopulinus* I have never found this. The amount of white is also greater in the Australian bird, and the shape of the mirror is different, as is shown in the accompanying figures. *L. corallinus* of Bonaparte has been supposed to be *L. maculipennis*, Licht., on the strength of the assertion in the Conspect. Av. that the type was obtained in Brazil by Castelnau. I have examined the type, which bears no indication of locality, nor do I for a moment

Fig. 3.

Three outer primaries of *L. novæ-hollandiæ*, old.

believe that it ever was killed in Brazil; it is, however, of this species, and a large-billed example.

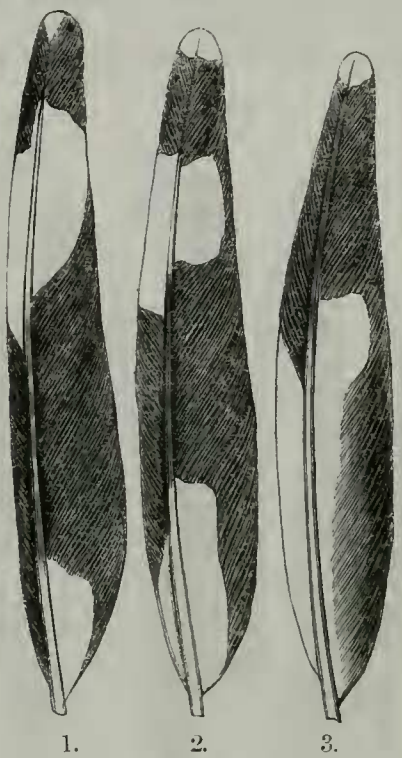
To make matters plainer, I have had figures prepared of the three outer primaries in three different specimens of this species. In fig. 1 (p. 185) is given the pattern in a young bird, taken from a drawing by Dr. O. Finsch of the type of *Gavia pomarre* of Bruch, 1853 (but *not* his *G. pomare* of 1855, which latter = *L. bulleri*), in the Mainz Museum. Fig. 2 (p. 186) represents the primaries of Bruch's *G. andersonii*, from the same source. Fig. 3 (p. 187)

shows the pattern of an *old L. novæ-hollandiæ*, obtained in Tasmania by Capt. V. Legge, R.A., and, if compared with fig. 4 (p. 188), will show the difference between this species and *old L. scopulinus*.

27. Larus scopulinus, Forst. (Fig. 4.)

Larus scopulinus, Forster, Descr. Anim. p. 106 (1844), New Zealand; Schlegel, M. P.-Bas, *Lari*, p. 28 (1863); Finsch, J. f. Orn. 1870, p. 360; Buller, B. of N. Zeal. p. 273 (1873).

Fig. 4.



Three first primaries of *L. scopulinus*, old.

Larus novæ-hollandiæ, Gray, Voy. Ereb. & Terr. Birds, p. 18 (1844), New Zealand (nec Stephens).

Lestris scopulinus, Ellman, Zoologist, 1861, p. 7472.

Hab. New Zealand.

Under the head of the preceding species I have pointed out the differences which seem to me to separate this form from *L. novæ-hollandiæ*; but the drawing (p. 188) of the first primaries of an old bird will show the principal point of distinction better than any description.

28. Larus hartlaubi (Bruch). (Fig. 5.)

Gavia hartlaubi, Bruch, J. f. Orn. 1853, 102, et 1855, p. 268, Cape G. Hope (type examined, H. S.).

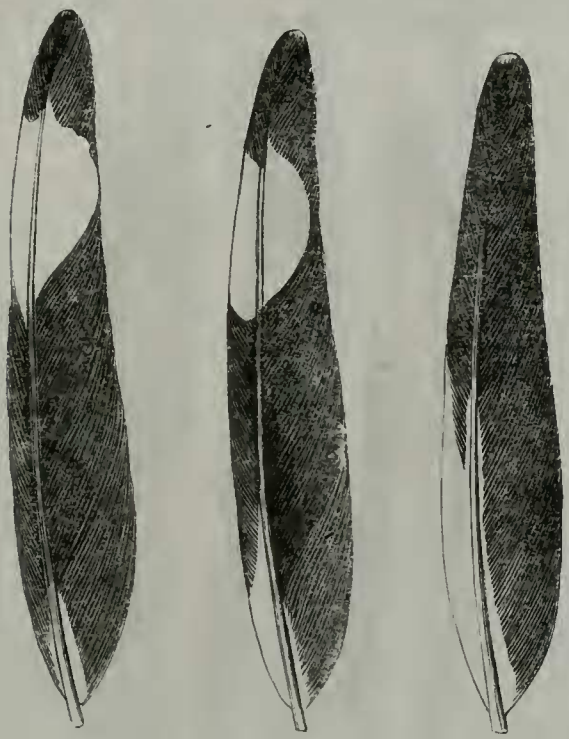
"*Larus poiocephalus*, Sw.," Layard, B. S. Africa, p. 368 (1867), nec Sw.

Larus hartlaubi, Saunders, P. Z. S. 1874, p. 293.

Hab. Southern coast of Africa, especially about Table Bay, Cape of Good Hope, where Mr. Layard obtained many specimens and also eggs, some of which he presented to me.

For a long time this species was supposed to be the winter or hoodless dress of the grey-capped *L. phæocephalus*, Sw.; but, as I have already pointed out (P. Z. S. 1874, p. 293), the present species

Fig. 5.



1. 2. 3.

Three first primaries of *L. hartlaubi*, ad.

never has a hood at all. It is quite distinct from its close allies *L. scopulinus* and *L. novæ-hollandiæ*, and may be recognized by its smaller size, proportionally longer and slenderer bill, which is of a rich crimson, and by the more sooty colour of the under wing-coverts, especially along the carpal joint. There is a small elongated mirror on the first and second primaries; but the remaining portions of those feathers are black almost to the roots. The drawing (fig. 5) shows the pattern of the primaries.

29. Larus bulleri, Hutton. (Figs. 6 & 7.)

Gavia pomare, Bruch, J. f. Orn. 1855, p. 285 (not of 1853, which = *L. novæ-hollandiæ*).

Bruchigavia melanorhynchus, Buller, Ibis 1869, p. 43 (nec *L. melanorhynchus*, Temm.).

Larus (*Bruchigavia*) *melanorhynchus*, Finsch, Ibis, 1869, p. 381; Travers, Trans. N.Z. Inst. 1871, p. 209.

Larus bulleri, Hutton, Cat. Birds New Zeal. 1871, p. 41; Potts, Ibis, 1872, p. 38; Buller, B. New Zeal. p. 276, et fig.

Hab. This species appears to be restricted to New Zealand, and perhaps to the South Island.

I have examined the type of Bruch's *L. pomare* of 1855; and it is undoubtedly of this species; but the type of his *L. pomarre* of 1853

Fig. 6.

1. 2. 3.

Three outer primaries of *L. bulleri*, old, from the type.

is as certainly *L. novæ-hollandiæ*; and it is to the latter that Mr. Buller alludes as having been examined by him previous to the publication of his 'Birds of New Zealand.' The third specimen entitled *L. pomare* in the Mainz collection is a young *L. ridibundus*! Bruch's name, therefore, cannot be employed, having been previously applied to another species; and this species must stand as *Larus bulleri*,

Hutton. It is very distinct from *L. scopulinus*, and appears to frequent inland lakes and river-beds in preference to the sea-shore. The drawings (pp. 190, 191) showing the distinctive markings of the three outer primaries will be better than any description.

Fig. 7.

Three outer primaries of *L. bulleri*, nearly ad., from the type of *Gavia pomare*, Bruch, of 1855.

During my recent visit to Bremen I went into the question of this and the three preceding species with Dr. Finsch, who had previously studied the subject and had made numerous and careful drawings of the primaries of Bruch's types of *L. pomare* in the Mainz Museum, and of many other specimens. These drawings he most generously placed at my disposal; and, thanks to his liberality, I am enabled to figure the primaries of two of Bruch's types, bearing the same name, but belonging to two totally distinct species.

30. Larus gelastes, Licht. (Fig. 8.)

Larus gelastes, Licht. in Thienem. Fortpflanz. Vög. Eur. pt. v. p. 22 (1838), type in Berlin Mus.; Keys. & Blas. Syst. Verzeichn. Europ. Säug. p. 95 (1840); Degl. Orn. Europ. ii. p. 318 (1849); Bree, B. Eur. 2nd ed. v. p. 72 (1876); Blanford, East Persia, ii. p. 291 (Makran coast).

"*Larus leucocephalus*, Boissonnean," fide Keys. & Blas. op. cit. p. 22.

Larus genei, De Brème, Rev. Zool. ii. (1839) p. 321.
Larus tenuirostris, Temm. Man. d'Orn. 2nd ed. pt. iv. p. 478, pl. (1840); Crespon, Faune Mérid. ii. p. 126 (1844).
Xema lambruschinii, Bp. Icon. Faun. Ital. i. Ucc. p. 135, pl. (livr. xxvii. 1840).
Xema gelastes (Licht.), Boie, Isis 1844, p. 192.
Xema genei (De Brème), id. loc. cit.
Gavia gelastes, Bruch, J. f. Orn. 1853, p. 102, et 1855, p. 286.
Larus columbinus, Golowatschow, Bull. Soc. Imp. Nat. Mosc. 1854, t. i. p. 435.
"*Gelastes rubriventris* (Vieill.)," Bp. Naum. 1854, p. 216.

Fig. 8.

1. 2. 3.

Three outer primaries of *L. gelastes*, juv.

Gelastes lambruschini, Bp. Cat. Parzud. p. 11 (1855); id. Consp. Av. ii. p. 227.
Larus subroseus et *Larus brehmii*, Heugl. Syst. U. Vög. N.O.-Afr. Sitz. Ak. Wiss. Wien, 1856, p. 321; cf. Heugl. Orn. N.O.-Afr. ii. Abth., Band 2, p. 1412.
Gelastes columbinus. Bp. Consp. Av. ii. p. 227 (1857).
"*Gelastes leucocephalus*, Brisson," Bp. Consp. Av. ii. p. 227 (syn.).

Larus lambruschini, Bp., Schl. M. P.-Bas, *Lari*, p. 28 (1863); Hume, Stray Feath. i. p. 274 (1873).

Chroicocephalus gelastes, Licht. Nomencl. Av. M. Berolst. p. 98.

"*Larus arabicus*, Hemp. & Ehr.," Mus. Berolst. (fide H. S.).

Hab. South coast of Spain, the Mediterranean and Black Sea (breeding); the Red Sea, Persian Gulf, and the coasts as far as Kurrachi; also West Africa to Senegal, whence there is a specimen in the Paris Museum.

This species seems to have no very near allies. It never has a hood; yet its structure and wing-pattern remind us of *L. ridibundus*. In appearance it is like *L. scopulinus*; but its wings are very long, its bill is slender, its flight is Tern-like, and its eggs are singularly like those of *Sterna cantiaca* and *S. media*. I locate it here because I do not know of any better position for it.

31. Larus leucophthalmus, Licht.

Larus leucophthalmus, Licht.; Temm. Pl. Col. liv. 62, pl. 366 (1825); id. Man. d'Orn. 4^{me} pt. p. 486 (1840); Heugl. Ibis, 1859, p. 349; König-Warth. Ibis, 1860, p. 129; Finsch & Hartl. Vög. Ostafr. p. 821; Finsch, Trans. Zool. Soc. vii. pt. vi. p. 302; Schl. M. P.-Bas, *Lari*, p. 32.

Iris (mispr.) *leucophthalmus*, Lesson, Tr. d'Orn. p. 618 (1831).

Xema lecophthalmum, Bp. Ucc. Eur. p. 78 (1842).

Xema leucophthalma, Gray, Brit.-M. List, Anseres, p. 171 (1844).

Adelarus leucophthalmus, Bruch, J. f. Orn. 1853, p. 106, et 1855, p. 278; Bp. Compt. Rend. xlii. p. 771 (1856); Blasius, J. f. Orn. 1865, p. 378.

Chroicocephalus leucophthalmus, Brehm, Naumannia, 1855, p. 295.

Larus masauanus, Heugl. Peterm. Geogr. Mittheil. 1861, p. 31.

Hab. Temminck states that this species visits Greece and the shores of the Bosphorus; but no recent travellers in those parts have ever met with it; and although two energetic naturalists, Dr. Krüper and M. Alléon, have for years been resident in the neighbourhood and have thoroughly explored the Greek Archipelago and the Bosphorus, they have never met with it, either there or in the Eubœan channel, which Lindermayer (Vög. Griech. p. 177) so particularly indicates. Even in the Red Sea it is, according to Von Heuglin, very scarce north of the tropic, though frequent more to the south; it does not, however, appear to go beyond the Gulf of Aden and the Somali coast; for neither Blanford nor Hume mention it as occurring along the Mekran coast; and its range is therefore much less extensive than that of the allied species *L. hemprichi*.

32. Larus hemprichi (Bp.).

Xema crassirostris (Licht.), Boie, Isis. 1844, p. 192.

Larus crassirostris, Licht. Nomencl. p. 99 (1854) (nec Vieill.), Mus. Berolst.

Adelarus hemprichii, Bp.; Bruch, J. f. Orn. 1853, p. 106 (descr.), et 1855, p. 278; Bonap. Naum. 1854, p. 212; Blasius, J. f. Orn. 1865, p. 378.

Larus hemprichi, Heugl. Ibis, 1859, p. 350; König-Warth. Ibis, 1860, p. 129 (nidif.); Schleg. Mus. P.-Bas, *Lari*, p. 32; Finsch, Trans. Zool. S. vii. pt. vi. p. 302, pl. xxvii.; Finsch & Hartl. Vög. Ostafr. p. 823; Blanford, Abyssinia, p. 441 (Red Sea); Hume, Stray Feath. i. p. 279; Blanford, East Persia, ii. p. 292 (Aden to Kurrachee harbour); Hume, Stray F. 1876, p. 414; Butler, op. cit. 1877, p. 296.

Hab. This Gull appears to have a wider range than its congener *L. leucophthalmus*, as it is not confined to the Red Sea south of the tropic, but also frequents the Persian Gulf and the coast eastward as far as Bombay. Von Heuglin and Baron König von Warthausen (*loc. cit.*) have given an excellent account of the habits and nidification of both these species; and more recently in 'Stray Feathers' Capt. Butler has given a description of the great colony on the island of Astola.

In the Bulletin de la Société Zoologique de France, 1re partie, 1877, p. 32, M. Jules Vian gives an account of two immature specimens, one of *L. leucophthalmus* and one of *L. hemprichi*, which were supposed to have been obtained on the coast of Nice. M. Vian showed me these specimens when I was last in Paris; and they are undoubtedly genuine examples of the respective species. M. Vian thinks that the opening of the Suez Canal may have caused their appearance upon the shores of France; I cannot prove the contrary, but, from the make-up of the skins, I must confess I am very sceptical as to their having got so far as Nice *alive*. They had passed through at least one, if not two dealers' hands before M. Vian saw them.

33. Larus atricilla, Linn.

Larus atricilla, Linn. Syst. Nat. i. p. 225 (1766), nec Pallas (ex Catesby); Gm. Syst. Nat. i. p. 600 (1788); Temm. Man. d'Orn. ed. 2, pt. ii. p. 779 (Mediterranean, in error); Montagu, Orn. Dict. Rennie's ed. p. 259 (1833) (Winchelsea); Schl. M. P.-Bas, *Lari*, p. 44 (1863); Scl. & Salv. P. Z. S. 1871, p. 576; Coues, B. N.-West Am. p. 650 (1874); Reid, Zoologist, 1877, p. 489 (Bermudas).

Larus ridibundus, Wilson, Am. Orn. ix. p. 89, pl. 74. fig. 4 (1814), nec Linn.; Léotaud, Ois. de Trinidad, p. 532.

Xema atricilla, Boie, Isis, 1822, p. 563; Cab. in Schomb. Guiana, iii. p. 761.

Gavia atricilla, Macgill. Man. Brit. Orn. ii. p. 240 (1842).

Chroicocephalus atricilla, Bruch, J. f. Orn. 1853, p. 106; Lawr. B. N. Am. p. 850 (1858).

Chroicocephalus serranus, Bruch, J. f. Orn. 1853, p. 106 (nec Tschudi).

Atricilla catesbyi, Bruch, J. f. Orn. 1855, p. 287.

"*Atricilla megalopterus*," Bp.; Bruch, J. f. Orn. 1855, p. 287.

"*Atricilla microptera*," Bp.; Bruch, tom. cit. p. 288.

Hab. America, from Maine, on the east coast, down to the mouth of the Amazons and to the West-Indian Islands; on the west coast,

California, Mexico, Guatemala, and as far south as Tumbez, the northern frontier of Peru (*Jelski*). Once obtained by Col. Montagu at Winchelsea, Sussex. The specimen in the British Museum, from his collection, is undoubtedly of this species; but there seems to be no warrant for its reputed occurrence in Southern Europe and the Mediterranean.

This species may always be known by its black primaries.

34. Larus franklini, Sw. & Rich.

Larus atricilla, J. Sabine, App. Franklin's Polar Sea, p. 695 (1823), nec Linn. nec auctt. (the description clearly applies to this species).

Larus franklini, Sw. & Rich. F. Bor.-Am., Birds, p. 424, pl. lxxi. (1831); Schlegel, Mus. Pays-Bas, *Lari*, p. 36 (1863); Scl. & Salv. P. Z. S. 1871, p. 577; Newton, P. Z. S. 1871, p. 57, pl. iv. fig. 4, egg (Manitoba); Coues, B. N.-West Am. p. 653 (1874).

Larus cucullatus, Licht. MSS. (Mexico), type in Berlin Mus. (examined, H. S.).

Larus pipixcan, Wagler, Isis, 1831, p. 515.

Xema franklini, Bp. Comp. L. B. Eur. & N. Am. p. 62 (1838); Boie, Isis, 1844, p. 194.

Xema pipixcan, Boie, *loc. s. cit.*

Chroicocephalus franklini, Bruch, J. f. Orn. 1853, p. 104, et 1855, p. 289; Lawr. B. N. Am. p. 851 (1858).

Chroicocephalus cucullatus, Bruch, J. f. Orn. 1853, p. 104, et 1855, p. 290; Lawr. B. N. Am. p. 851 (1858); Coues, Proc. Phil. Ac. 1862, p. 309.

Chroicocephalus kitlitzii, Bruch, J. f. Orn. 1853, p. 104 (described from a drawing), nec Swinhoe, P. Z. S. 1860, which = *L. saundersi*.

Chroicocephalus schimperi, Bruch, J. f. Orn. 1853, p. 104 (nec Schlegel, 1863, which = *L. saundersi*).

Larus cinereo-caudatus, Ph. et Landb. Wiegm. Arch. 1861, p. 293.

Hab. Interior of North America, west of the Mississippi; breeds in Manitoba; seldom visits the Atlantic coast, but has once occurred at St. Bartholomew's, West Indies (*Sund.*); goes down the Pacific coast as far as Chili, whence I have a fully adult example with partial hood, collected by Mr. E. Reid, of Santiago, and also one from Callao, Peru.

The primaries of this species undergo much alteration with the age of the bird; and in time the subapical mirror on the first extends over the greater part of the webs.

From the description there can be little or no doubt that Bruch's *L. kitlitzi* and *L. schimperi* are referable to this species. Both were suppressed in his second review (1855), when he corrected a few of his more glaring errors; and all trace of the second name has vanished from the Mainz Museum, where I especially looked for it, as Schlegel had adopted it for a totally different Chinese species. The type was said to have come from New Zealand, had a bright red bill, dark hood, and black primaries with white tips.

35. Larus serranus, Tsch. (Fig. 9.)

Larus serranus, Tschudi, Wiegm. Arch. 1844, pt. i. p. 314; Fauna Peruana, Aves, p. 307 (1845–6); Scl. & Salv. P. Z. S. 1871, p. 577.

Chroicocephalus personatus (Natt.), Bruch, J. f. Orn. 1853, p. 104, et 1855, p. 289.

Xema cirrhocephalum, Peale; Cassin, U.S. Expl. Exp. Orn. p. 381 (1858).

Larus glaucotis, Cassin, *l. c.* p. 381 (1858).

Gavia serrana, Bp. Rev. Zool. 1855, p. 19.

Larus personatus, Natt.; Schl. M. Pays-Bas, *Lari*, p. 35 (1863).

Gavia personata, Blasius, J. f. Orn. 1865, p. 372.

Larus bonapartii, Scl. & Salv. P. Z. S. 1868, p. 178.

Hab. This fine black-hooded species is found throughout the Cordillera and the Andes of Northern Chili, Bolivia, Peru, and as far north as Ecuador, whence Mr. Salvin has a specimen. It breeds

Fig. 9.

1. 2. 3.

Three outer primaries of *L. serranus*, ad.

in colonies on the shores of mountain-lakes, and is well known to the Quichua-speaking Indians under the name of "Quiulla," doubtless an imitation of its cry. During the bad weather it descends to the west coast. The eggs and nestlings are as yet unknown to me.

Messrs. Sclater and Salvin (P. Z. S. 1871, p. 577) quote Burmeister as an authority for the occurrence of this species near Mendoza in the Argentine Republic; but the description which he gives clearly applies to *L. maculipennis*; indeed the dimensions cited being *smaller* than those of *his L. maculipennis*, Licht. (which, again, is not that species, but *L. cirrhocephalus*, Vieill.), show clearly that his bird cannot possibly be the real *L. serranus*, which is the largest of the group of the true Hooded Gulls in America. On the other hand, the dimensions assigned by Peale and Cassin to their respective *X. cirrhocephalum* and *L. glaucotis* (18 inches long), and the descriptions of the markings of the primaries, go to prove that those names must be referred to this species. The figure (p. 196) shows the pattern of the primaries in an adult and tolerably old bird.

36. Larus brunneicephalus, Jerdon. (Fig. 10.)

Larus brunneicephalus, Jerdon, Madras Journ. xii. p. 225 (1840); Schl. Mus. P.-Bas, *Lari*, p. 35 (1863).

Fig. 10.

1 2 3.

Three outer primaries of *L. brunneicephalus*, ad.

Xema brunnicephala, Gray, List of B. in Brit. Mus. iii. p. 172 (1844); Jerdon, B. of India, iii. p. 832 (1864); Holdsworth, P. Z. S. 1872, p. 480 (Ceylon).

Chroicocephalus brunnicephalus, Bruch, J. f. Orn. 1853, p. 105.
Chroicocephalus brunniceps, Cabanis, J. f. Orn. 1853, p. 105 (note); Bruch, J. f. Orn. 1855, p. 291.
Chroicocephalus brunneicephalus, Bp. Compt. Rend. Ac. Sc. xli. p. 73 (1856); Swinhoe, P. Z. S. 1871, p. 421; Dav. et Oust. O. de la Chine, p. 521.
Xema brunneicephalum, A. David, N. Arch. Mus., Bull. vii. no. 460 (1871).
Larus lacrymosus, Licht. (Bengal, imm.), type in Berlin Mus. (examined, H. S.).
Gavina lacrymosus (Licht.); Bp. Naum. 1854, p. 212.
Gavia brunnicephalus (Jard.); Bp. Naum. 1854, p. 213.
Chroicocephalus tibetanus, Gould, P. Z. S. 1864, p. 54. [Tibet, Major Hay.]
Xema brunneicephala, Hume, Yarkand Exp. Orn. p. 300, pl. xxxii. (1873); Blyth, J. A. S. B. 1875, pt. ii. p. 162 (Burma).

Hab. Henderson found this Gull very abundant in full breeding-plumage in July, at an elevation of 15,000 feet, near the Pangong lake; and in winter it occurs both on the inland waters and along the coast of India, as far west as Sind. Eastward it occurs in Burma and visits Ceylon, where it is abundant. David obtained it abundantly in Mongolia and China, apparently as near to the sea-board as Pekin. Taczanowski, however, does not cite it amongst the species found in any part of Siberia; and it is therefore doubtful if it can be Middendorff's *L. ridibundus*, var. *major*. As regards its reported occurrence in Japan, Cassin's bird obtained in Parry's expedition is clearly *L. ridibundus*.

37. Larus ichthyaëtus, Pall.

Larus ichthyaëtus, Pallas, It. ii. App. no. 27 (1776), Caspian; Gm. Syst. Nat. i. p. 599 (1788); Pallas, Zoogr. Ros.-As. ii. p. 322 (1811); Rüpp. Reise N. Afr. Atlas, p. 27, pl. 17 (1826), Red Sea; Cassin, Perry's Exp. Japan, ii. p. 232 (1856) (?); Tristram, Ibis, 1868, p. 330, Palestine; Shelley, B. of Egypt, p. 307, pl. 13 (1872); Schlegel, M. P.-Bas, *Lari*, p. 34 (1863); Dresser, B. of Europe, pt. xviii. (June 1873).
Ichthyaëtus, Kaup, Natürl. Syst. pp.102,169 (1829), type of genus *Ichthyaëtus*.
Xema ichthyaetum, Bp. B. Eur. & N. Am. p. 62 (1838).
Larus kroicocephalus, Jameson, Journ. As. Soc. viii. p. 242 (1839).
Kroikocephalus ichthyœtus, Jerdon, B. of India, iii. p. 831 (1864).
Chroicocephalus icthyaëtus, Bruch, J. f. Orn. 1853, p. 104; Swinhoe, P. Z. S. 1863, p. 327.
Larus ichthyaëtus minor, Schl. M. P.-Bas, *Lari*, p. 34 (1863).

Hab. Caspian Sea and inland lakes, Lake of Galilee (*Tristram*), Mediterranean coast of Egypt and up to Nubia, the Red Sea, thence to Bombay and down the coast to Madras, and on the lakes and large rivers of Northern India. As a straggler, in the Black Sea and the Greek Archipelago, and once at the mouth of the Exe, in Eng-

land Cassin states that Perry's expedition obtained two specimens in Yedo Bay, Japan, where it is described as abundant; but both the supposed examples were young birds without a trace of a hood, only striated on the head; and the other points of the description would equally apply to young Herring-Gulls, which I am inclined to think they were. At all events the reported occurrence of this Gull in Japanese waters remains unconfirmed; Capt. Blakiston has never met with it; and Capt. St. John, H.M.S. 'Sylvia,' during the years he was surveying those coasts, never saw it.

38. Larus melanocephalus, Natt. (Fig. 11.)

Larus melanocephalus, Natt. Isis, 1818, p. 816; id. in Temm. Man. d'Orn. 2nd ed. ii. p. 777 (1820); Schl. M. P.-Bas, *Lari*,

Fig. 11.

1. 2. 3.

Three outer primaries of *L. melanocephalus*, jr.

p. 43 (1863); Degl. & Gerbe, Orn. Europ. ii. p. 437 (1867); Bree, B. of E. 2nd ed. v. p. 81 (breeding in Black Sea); Saund. Ibis, 1872, p. 79 (Thames).

Xema melanocephalus, Boie, Isis, 1822, p. 365.

Xema melanocephalon, Brehm, Vög. Deutschl. p. 757 (1831).

Xema caniceps, Brehm, Vög. Deutschl. p. 758.
Chroicocephalus melanocephalus, Bruch, J. f. Orn. 1853, p. 104.
Melagavia melanocephalus, Bp. Naum. 1854, p. 213.
Gavia melanocephala, Bp. Compt. Rend. 1856, xlii. p. 771.

Hab. Mediterranean and Black Sea; outside the Straits of Gibraltar I observed it, apparently breeding, in the marshes of Huelva; and it regularly ascends the west coast of the Iberian peninsula and of France as far as Bordeaux, as is proved by the specimens annually obtained there. It is therefore not at all astonishing that an immature specimen should have been shot out of a flock of *L. ridibundus* at Barking Creek in January 1866. This example is in the British Museum.

In old birds the primaries are white, excepting a very black streak down the outer web of the first primary only; but it is not unusual to find birds with the full black hood and white tail indicative of maturity, but with a good deal of black on both the outer and inner webs of the outer five primaries, the black crossing both webs near their extremities and forming a subapical bar. The drawings (fig. 11, p. 199, and fig. 12, p. 201) show the differences between the pattern of the three outer primaries of a bird of the year, shot in March, and that of a *L. ridibundus* of about the same age.

39. LARUS RIDIBUNDUS, Linn. (Fig. 12.)

? *Larus cinerarius*, Linn. Syst. Nat. i. p. 224 (1766).
Larus ridibundus, Linn. Syst. Nat. i. p. 225 (1766); Schl. M. P.-Bas, *Lari*, p. 37 (1863).
Larus erythropus, Gm. Syst. Nat. i. p. 597 (1788).
Larus cinerarius, Schäff. Mus. Orn. p. 63 (1789); Pall. Z. Rosso-As. ii. p. 326.
Larus canescens, Bechst. Orn. Tash. p. 370 (1802).
Larus atricilla, Pallas, Zoogr. Rosso-As. ii. p. 324 (1811), nec Linn.
Larus nævius, id. tom. cit. p. 327.
Larus capistratus, Temm. Man. d'Orn. 2nd ed. pt. ii. p. 785 (1820).
Xema ridibundus, Boie, Isis, 1822, p. 563.
Xema capistratus, Boie, Isis, 1822, p. 563, et 1844, p. 192.
Xema ridibundum, Brehm, Vög. Deutsch. p. 760 (1831).
Xema pileatum, id. op. cit. p. 761.
Xema capistratum, id. op. cit. p. 762.
Chroicocephalus capistratus, Eyton, Hist. Rarer Brit. B. p. 63 (1836); Bruch, J. f. Orn. 1853, p. 105.
Chroicocephalus ridibundus, Eyton, Cat. Brit. Birds, p. 53 (1836); Bruch, J. f. Orn. 1853, p. 105; Swinhoe, P. Z. S. 1871, p. 421; David & Oust. Ois. de la Chine, p. 520 (1877).
Gavia ridibundus, Bp. Naumannia, 1854, p. 213.
Gavia capistratus, Bp. *op. cit.* p. 213.
Chroicocephalus pileatus, Brehm, Naum. 1855, p. 295.
Larus brunneicephalus?, Cassin, Perry's Exp. Japan, ii. p. 233 (1856), clearly this species in winter dress.

Larus cahirinus, "Hemp. & E., Syria," Mus. Berolst (*fide* H. S.).
Larus cahiricus, "Ehr. Arabia," id. (*fide* H. S.).

Hab. Northern and temperate Europe, breeding; the Mediterranean coast to Egypt and Asia Minor, the Red Sea, Arabian coast, and the coast, interior waters, and rivers of India; ascending for 500 miles up the Burrampootra (*Godwin-Austen*), Burma, China, and

Fig. 12.

Three outer primaries of *L. ridibundus*, jr.

Japan in winter; also throughout the more temperate portions of Siberia (breeding). It is said by Schlegel to visit "South Africa;" but I remain rather suspicious of the accuracy of the collectors who are responsible for that somewhat vague locality, so long as this statement is unconfirmed from other sources.

40. Larus maculipennis, Licht. (Fig. 13.)

Larus maculipennis, Licht. Verz. Doubl. p. 83 (1823), Monte Video (type examined, H. S.); Scl. & Salv. Nom. Av. Neotrop. p. 148 (1873); Durnford, Ibis, 1877, p. 43 (Chuput valley, Patagonia); id. tom. cit. p. 202 (prov. B. Ayres).

Xema cirrhocephalum, Gould, Zool. Beagle, iii. p. 142 (1841), partim.

Xema cirrhocephala?, Gray, List Birds Brit. Mus. iii. p. 173 (1844), partim (East Patagonia).

Chroicocephalus maculipennis, Bruch, J. f. Orn. 1853, p. 105.

Gavia maculipennis, Blasius, J. f. Orn. 1865, p. 374.

"*Larus serranus*, Tsch.," Burmeister, La Plata-Reise, ii. p. 519 (1861), nec Tschudi (Entre Rios, Mendoza).

Larus cirrhocephalus, Hudson, P. Z. S. 1870, p. 802; id. P. Z. S. 1871, p. 4, nec Vieillot.

Larus glaucodes, Saunders, P. Z. S. 1874, p. 294 (partim).

Hab. Chuput valley, North-east Patagonia (breeding), up to the La Plata, the Argentine Provinces, Mendoza, Entre Rios, Uruguay, and the south coast of Brazil.

Fig. 13.

1. 2. 3.

Three outer primaries of *L. maculipennis*, old.

Burmeister's description of the bird which he calls *L. serranus* clearly applies to this species; the dimensions (length 12 in., wing 11 in., tarsus 2 in.) exactly suit it, whilst the wing of true *L. serranus* is over 14 in. long.

The distinction between this species and the next, *L. glaucodes*, seems to rest upon the patterns of the primaries, as shown in the drawings (figs. 13 and 14). In *L. maculipennis* the black forms a bar; in *L. glaucodes* it is a mere border: and this is perfectly constant.

I have selected the primary of the *oldest L. maculipennis* I could find as presenting the least amount of black, and therefore closest to *L. glaucodes*; but, in spite of that, the difference is quite recognizable.

41. Larus glaucodes, Meyen. (Fig. 14.)

Larus glaucodes, Meyen, Obs. Zool. p. 115, pl. xxiv.; id. Beitr. Zool. p. 239, pl. xxxiv. (1834); Gay, Faun. Chil. Aves, i. p. 480 (1847); Cassin, Birds U.S. Astronom. Exp. p. 204 (1855); Scl. & Salv. Nom. Av. Neotrop. p. 148 (1873).

Larus glaucotes, Cabanis, Ibis, 1861, p. 312.

Larus glaucotis, Schlegel, Mus. P.-B. *Lari*, p. 42 (1863).

Xema cirrhocephalum, Gould, Zool. Beagle, iii. p. 142 (1841), part., nec Vieill.

Xema cirrocephala, Gray, List Birds Brit. Mus. iii. p. 173 (1844).

Fig. 14.

1. 2. 3.

Three outer primaries of *L. glaucodes*, old.

Xema glaucodes, Boie, Isis, 1844, p. 192 ?

Larus albipennis, Peale, Zool. U.S. Expl. Exp. p. 288 (1848); *fide* Cassin, in Orn. U.S. Expl. Exp. p. 379 (1858); Chili.

Larus albipennis, Licht. M.S.; Gray, List B. Brit. M. p. 173 (1844), type in Berlin Mus. (examined, H. S.).

Chroicocephalus glaucotes, Bruch, J. f. Orn. 1853, p. 105, et 1855 p. 291.

Gavia roseiventris, Gould, P. Z. S. 1859, p. 97 (Falkland Islands).

Larus roseiventris, Sclater, P. Z. S. 1860, p. 391 ; Abbott, Ibis, 1861, p. 166 (Falkland Islands).

Gavia glaucotis, Blasius, J. f. Orn. 1865, p. 374.

Chroicocephalus glaucodes, G. R. Gray, Hand-l. Birds, iii. p. 114.

Hab. Falkland Islands, Straits of Magellan, Western Patagonia, and coast of Chili. I cannot find any evidence of its occurrence in Eastern Patagonia ; and certainly at the Chuput river, lat. 43° S., its place is taken by *L. maculipennis*.

Specimens from the Falklands seem to be smaller on the average than Chilian examples ; but there is no other point of difference.

42. Larus cirrhocephalus, Vieill.

Larus cirrhocephalus, Vieillot, in 2nd ed. Nouv. Dict. Hist. Nat. t. xxi. p. 502 (1818), Brazil ; id. Gal. des Ois. ii. p. 223, pl. 289 (1834); Schlegel, M. P.-Bas, *Lari*, p. 37 (1863); Scl. & Salv. P. Z. S. 1871, p. 578 ; iid. Nom. Av. Neotrop. p. 148 (1873) ; Saunders, P. Z. S. 1874, p. 292 ; Durnford, Ibis, 1877, p. 201.

Larus poliocephalus, Temm. M. d'Orn. ii. p. 780 (1820) ; Max. v. Wied, Beitr. iv. p. 854 ; vide Salv. Ibis 1874, p. 320.

Chroicocephalus cirrhocephalus, Bruch, J. f. Orn. 1853, p. 106.

Cirrhocephalus plumbiceps, Bruch, J. f. Orn. 1855, p. 288.

"*Larus maculipennis*, Licht.," Burm. Syst. Ueb. Th. Brasil. iii. p. 448 (1856), nec Licht. (Brazil coast, especially the small islands); id. La Plata-Reise, ii. p. 518. no. 256 (1861) (R. Paraná).

Gavia cirrhocephala (part.), Blasius, J. f. Orn. 1865, p. 376.

Hab. Coast of Brazil, bays and lakes, down to Rio de la Plata, and up the Paraná. Mr. Durnford did not observe it south of Buenos Ayres. On the Pacific coast it occurs near Callao, one specimen from Chorillos being in my own collection, and another, obtained by M. Grec of Lima at the Chinchas Islands in 1855, being in the Bordeaux Museum.

43. Larus phæocephalus, Sw.

Larus poiocephalus (sic), Swains. B. W. Afr. ii. p. 245, pl. 29 (1837) : ad. ex. believed to be the type, in Cambr. Mus. from Senegambia, examined, H. S.

Xema phæocephala, Strickl. & Scl. B. of Damar., Contrib. Orn. 1852, p. 160.

Gavia cirrhocephala (part.), Blasius, J. f. Orn. 1865, p. 376.

Larus poiocephalus, Swains., Layard, B. S. Afr. p. 368 (1867), partim ; Barboza du Bocage, J. f. Orn. 1876, p. 293 (Cunene, Benguela).

Larus phæocephalus, Hartl. Orn. W.-Afr. p. 252 (1857); id. J. f. Orn. 1861, p. 273 ; Finsch & Hartl. Vög. Ost-Afr. p. 825 (1870); Saunders, P. Z. S. 1874, p. 292.

Cirrhocephalus poiocephalus, Gurney, Anderss. B. Damaral. p. 358 (1872).

Hab. West Coast of Africa from the Gambia down to Walvisch

Bay, Damaraland, and at Lake Ngami (*Chapman*). I possess or have examined specimens from the above localities. The species may extend as far as the Cape of Good Hope and to the south-east coast; but of this I have no positive information.

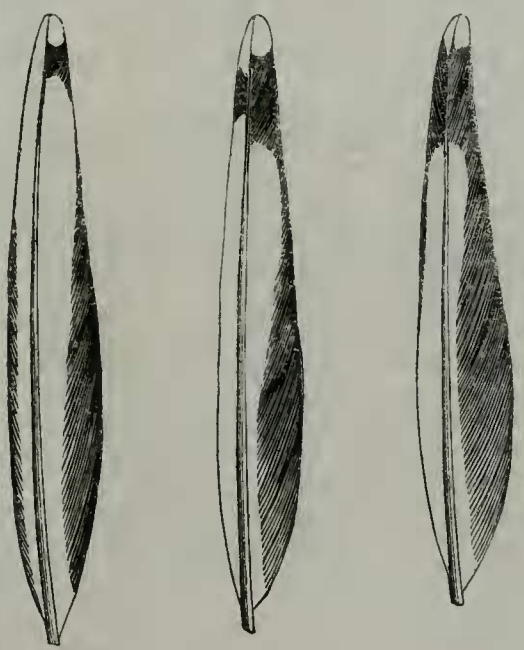
This species is very closely allied to *L. cirrhocephalus*; but it is smaller, and the bill and feet are orange-red, whilst in the larger American species those soft parts are of a deep lake-colour; and the feathers in this species do not come down so close to the base of the nostrils—differences which are quite sufficient to separate the two forms. The African species was long confounded with *L. hartlaubi* of the Cape of Good Hope, a bird belonging to a totally distinct group, and which never has a hood at all.

44. Larus saundersi (Swinhoe). (Fig. 15.)

"*Gavia kittlitzii*, Bruch," Swinhoe, Ibis, 1860, p. 68 (not of Bruch, which is described from a drawing and is *L. franklini*).

Larus schimperi, Schlegel, M. P.-Bas, *Lari*, p. 40, 1863 (not of Bruch, 1853, nor of Bp., which = *L. franklini*).

Fig. 15.



1. 2. 3.

Three outer primaries of *L. saundersi*, ad.

Chroicocephalus kittlitzii, Swinh. Ibis, 1863, p. 428, et P. Z. S. p. 328.

Xema kittlitzii, David, N. Arch. Mus. Bull. vii. 1871, no. 461.

Chroicocephalus saundersi, Swinhoe, P. Z. S. 1871, pp. 273, 421, pl. 22; David & Oustalet, Ois. de la Chine, p. 523 (1877).

Hab. The coasts of China, especially about Amoy, in winter

(*Swinhoe*), and the interior waters, and those of Mongolia (*David*). Nidification unknown.

This well-defined species, with which my friend the late R. Swinhoe did me the honour to associate my name, is, to judge by the structure of its feet, an inland species or river-Gull during a great part of the year. The tarsi are slender, the hind toe elevated and long, and the webs of the feet are much scalloped; indeed the foot is almost that of a Marsh-Tern. Had Bonaparte or Bruch been acquainted with it, they would doubtless have created a genus for it. The bill is very stout and corvine-looking; the hood, in breeding-plumage, is of a deep metallic black; and the pattern of the primaries (see fig. 15, p. 205) is also peculiar, these being principally white with a black bar near the tip, and a black border to the edge of the inner web.

45. Larus minutus, Pallas.

Larus albus, Scop. Ann. i. Hist. Nat. p. 80. no. 106 (1769).

Larus minutus, Pallas, Reise Russ. Reichs, iii. p. 702, App. no. 35 (1776); Gm. Syst. Nat. i. p. 595 (1788); Pallas, Zoogr. Rosso-As. ii. p. 331 (1811); Schlegel, M. P.-Bas, *Lari*, p. 42 (1863); Sharpe and Dress. B. of Eur. pt. iv. (1871).

Larus atricilloides, Falk. Itin. iii. p. 355, t. 24, *fide* Gm. Syst. Nat. i. p. 601 (1788).

Xema minutus, Boie, Isis, 1822, p. 365.

Larus d'orbignyi, Audouin, Hist. Nat. de l'Egypte, pl. 9. fig. 3, Expl. p. 271 (1825).

Hydrocolœus minutus, Kaup, Nat. Syst. p. 113 (1829).

Larus nigrotis, Lesson, Tr. d'Orn. p. 619 (1831).

Chroicocephalus minutus, Eyton, Hist. R. Brit. B. p. 61 (1836); Bruch, J. f. Orn. 1853, p. 105.

Gavia minuta, Macgill. Hist. Brit. B. v. p. 613 (1852).

Hab. European coasts and occasionally inland (on passage and in winter); breeding in the marshes of Russia, and formerly in Gottland. Middendorff obtained it in May on the Lena, to the south of Jakusk, and as far east as the sea of Okotsk. Once in north India (*Irby*); North Africa to Egypt in winter.

Scopoli's description of *L. albus* applies fairly to this species, but it is not sufficiently precise to enforce the adoption of that name to the prejudice of a long accepted one like that of Pallas.

46. Larus philadelphiæ (Ord). (Fig. 16.)

Sterna philadelphia, Ord, Guthrie's Geogr. 2nd Am. ed. ii. p. 319 (1815), *fide* Lawr., B. N. Am. p. 252.

Larus minutus, J. Sabine, App. Franklin's Polar Sea, p. 696 (1823); Sw. & Rich. F. Bor.-Am. Birds, p. 426 (1831), nec Pallas.

"*Larus capistratus*, Temm.," Bp. Specch. Comp. p. 69 (1828), nec Temm.

Larus melanorhynchus, Temm. Pl. Col. livr. 85, tab. 504 (1830), Chili?

Larus bonapartii, Sw. & Rich. F. Bor.-Am., Birds, p. 425, pl. 72

(1831); Thompson, B. of Ireland, iii. p. 317 (1851), near Belfast; Schlegel, Mus. P.-Bas, *Lari*, p. 41 (1863).

Xema bonapartii, Bp. Birds of Eur. and N. Am. p. 62 (1838).

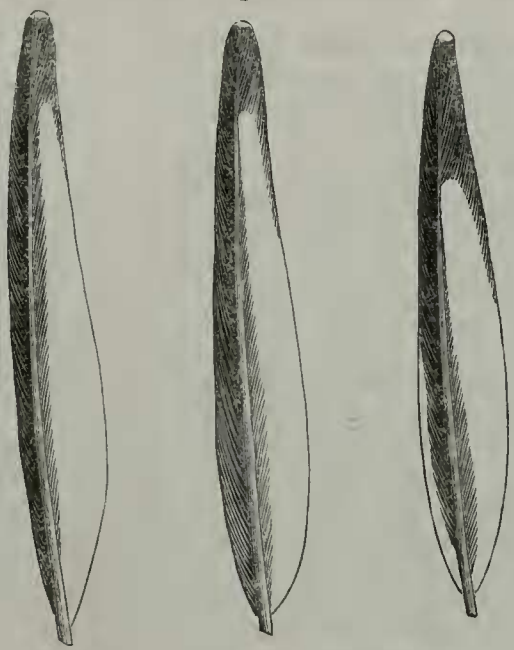
Chroicocephalus bonapartii, Bruch, J. f. Orn. 1853, p. 105, et 1855, p. 292.

Chroicocephalus subulirostris, Bp.; Bruch, J. f. Orn. 1853, p. 105 (type in Mainz Mus. examined, H. S.).

Gavia bonapartii, Bp. Naumannia, 1854, p. 213.

Gavia subulirostris, id. tom. cit. p. 213.

Fig. 16.



1. 2. 3.

Three outer primaries of *L. philadelphiæ*, jr.

Chroicocephalus philadelphia, Lawr. B. N. Am. p. 852 (1858); Dall & Bann. Tr. Chicago Ac. 1869, p. 305 (Alaska); Newton, P. Z. S. 1871, p. 57, pl. iv. fig. 6, egg (Arctic America).

Gavia bonapartei, Blasius, J. f. Orn. 1865, p. 371.

Larus philadelphia, Allen, Am. Nat. iii. p. 643 (Salt Lake); Harting, Handbk. Brit. B. p. 172 (1872); Reid, Zoologist, 1877, p. 489 (Bermudas).

Hab. British North America and Alaska (in summer), breeding on the Yukon and neighbouring localities. In autumn it descends the coasts of America, as far as California on the west and North Carolina on the east; as a straggler it has visited the Bermudas and also the British Islands.

The drawing (fig. 16) of the outer primaries in the young shows wherein the pattern differs from those of allied species. In the adult the distinctions are yet more marked.

Genus Rhodostethia, Macgill.

The distinguishing characteristic of this genus is the *cuneate tail*, in which respect the sole representative species is unlike every other. On account of this elongation of the central feathers of the tail, some systematists have placed it next to the *Stercorariinæ*; but it should not be inferred from this solitary point of resemblance that the two genera are at all closely related, their representatives being in other respects far apart. It is much to be desired that the sternum of the next specimen obtained should be preserved, as I believe this part of its structure has never been critically examined.

47. Rhodostethia rosea, Macgill.

Larus roseus, Macgill. Wern. Soc. Trans. v. no. xiii. p. 249 (1824), descr. of sp. from Melville Peninsula; Jard. & Selby, Ill. Orn. vol. i. pl. xiv.

Larus rossii, Richards. App. Parry's 2nd Voy. p. 359 (1825), Melville Peninsula; J. C. Ross, App. Ross's 2nd Voy., Nat. Hist. p. 36 (1835), Felix Harbour, Boothia; Sw. & Rich. F. Bor.-Am. ii. Birds, p. 427 (1831); J. C. Ross, App. Parry's Narr. p. 195 (1828).

Rossia rosea (Macgill.), Bp. Comp. List, p. 62 (1838).

Rhodostethia rossi, Macgill. Man. Brit. Orn. pt. ii. p. 253 (1842).

Rhodostethia rossii, id. Brit. Birds, v. p. 618.

Rhodostethia roseus, Bruch, J. f. Orn. 1853, p. 106.

Rhodostethia rosea, Saunders, Ibis, 1875, p. 484 (jr.); Payer, Austrian Exp. ii. p. 91 (English transl.); Dresser, B. of Eur. pt. i. (1877)

"*Larus collaris*," MS., Schreibers, in Mus. Vindob.

Hab. Melville Peninsula, 69½° N. lat., and Boothia, straggling to Greenland, once to the Faroes, once to Heligoland, and (on very questionable authority) once to England. This last specimen, which I have examined, has every appearance of having been mounted from a skin and not from the flesh. Ross and Parry state that it was seen to the north of Spitzbergen in about 82° N. lat.; but they did not obtain specimens, and no subsequent visitors to that district have observed it; more recently Lieut. Payer says that it was obtained about Franz-Josef Land.

There can be no doubt of the prior claim of Macgillivray's name for this species; but its imposition, in anticipation of that which Richardson intended to bestow on it, gave rise to a good deal of bad feeling at the time.

In 'The Ibis,' 1875, p. 484–487, I gave a description of the immature plumage of this Gull from two specimens in the Mainz Museum, and enumerated the eleven examples known to exist; to these may be added one more in Copenhagen, and one, of which Mr. O. Salvin has recently informed me, in the museum of Vienna: total thirteen specimens.

In reply to inquiries respecting the Vienna example, Hr. von Pelzeln informs me that it formed part of the collection made by Giesecké during his seven years' residence in Greenland, and came

into the possession of the Imperial Museum in 1818, when it received from Professor Schreibers the MS. and unpublished name of *Larus collaris*. In the interval between the publication of the 4to edition of Ross's 'Voyage to Baffin's Bay' and the later 8vo edition (both of which bear the date of 1819), Ross, or Leach (for, although under Ross's name, Leach was probably the real authority) heard of Schreibers's name, and, jumping at the conclusion that Schreibers's bird was *L. sabini*, inserted the synonym of *X. collaris* (Schr.) for that species in the 8vo edition. Had Schreibers's description been published, his name would have considerably antedated the present one.

Genus Xema, Leach.

The real distinguishing character of this genus, as instituted by Leach, is the *forked tail*; but the name has been improperly employed by Boie and others for many other species. Leach, however, defined it most clearly; and a generic name should never be used in any other sense than that of the founder.

48. Xema sabinii (Sabine).

Larus sabini, J. Sabine, Tr. Linn. Soc. xii. p. 520, pl. 29 (1818); J. Wilson, Ill. Ornith. pl. iii. (1831).

"*Xema sabini*, Leach," J. Ross, App. Ross's Voy. Baff. Bay, p. 57 (1819), 4to ed.; Steph. in Shaw's Gen. Zool. xiii. pt. i. p. 177, pl. 20 (1826); Eyton, Rarer Brit. B. p. 54 (1836).

"*Xema collaris* (Schreibers)," Ross in App. Ross's Voy. Baf. Bay, ii. p. 164 (1819), 8vo ed. (not in 4to ed.), nec Schreibers.

Gavia sabini, Macgill. Man. Brit. Orn. ii. p. 241 (1842).

Larus sabini, J. C. Ross, App. Ross's 2nd Voy. p. 37 (1835).

Larus sabinii, Richardson, App. Parry's 2nd Voy. p. 360 (1825); Sw. & Richs. F. Bor.-Am., Birds, p. 428 (1831); Middendorff, Sib. Reis., Zool. ii. p. 244, pl. xxiv. fig. 5, xxv. fig. 1 (young and egg), (1853).

Xema sabinii, Bruch, J. f. Orn. 1855, p. 292; Lawr. B. of N. Am. p. 856 (1860); Newton, P. Z. S. 1871, p. 57, pl. iv. fig. 5 (egg); Dresser, B. Europe, pt. xxxi. August 1874.

Larus sabinei, Schl. M. P.-Bas, *Lari*, p. 44 (1863).

Xema sabinei, Coues, B. of N.W. Am. p. 660 (1874–5); Reid, Zoologist, 1877, p. 490 (Bermudas).

Hab. Arctic America, breeding to the north of Upernavik, in Greenland, and then across to the west, breeding in Alaska (*Dall*); not rare in Plover Bay, Eastern Siberia (*Dall*), and breeding on the tundras of the Taimyr, north of 74° (*Middendorff*). In autumn it migrates southward; and many specimens have from time to time been obtained on the British coasts and those of the continent, as far east as Holstein, and on the French coasts. Most of these are birds of the year; but Dr. L. Bureau has an adult, with full black hood, captured on the coast of Brittany on August 25th, 1872. In America its southern range, as until now recorded, was down to New York on the east, and to Great Salt Lake, Utah, on the west—

roughly speaking, as far as 40° N. lat.; but Messrs. Sclater and Salvin have recently shown me a specimen from Prof. Steere's collection[1], Mus. University of Michigan, labelled "Macabi, September 1872," and on the card-label "Tumbez," Macabi Island being a little to the north of Huanchacho on the coast of Peru, in nearly 8° S. lat.—an enormous extension of its previously known limits. It is in adult plumage, with the exception of some dusky feathers on the nape; the forehead and head are white and devoid of the hood, which it was reasonable to suppose would only be worn during the breeding-season, although this is the first absolute *proof* I have had of this; the bill as in adults; the tail white and well-forked; feet rather faded. I imagine this to be a bird of the second year. This species has once occurred at the Bermudas.

The name of *X. collaris* was applied to this species as a synonym in the 8vo edition of Ross's 'Voyage' (1819), under the erroneous impression that this was the *L. collaris* to which Prof. Schreibers, then Director of the Vienna Museum, had given that MS. and unpublished name; but as a matter of fact that name belongs to an example of *Rhodostethia rosea*. For the elucidation of this point I am indebted to the kindness of Herr A. von Pelzeln, who also informs me that the Vienna Museum is the possessor of what is probably the oldest specimen of this species in any European collection, it having been received, without any published name or description, from the Ornithological Institution of that city about 1806.

49. Xema furcatum (Neboux).

Mouette à queue fourchue, Neboux, Rev. Zool. 1840, p. 290.

Larus furcatus (Neboux), Voy. 'Vénus,' Atlas, pl. x. (1846); Prévost & Des Murs, Voy. 'Vénus,' v. Ois. p. 277 (1855).

Xema furcatus, Bruch, J. f. Orn. 1853, p. 103.

Creagrus furcatus, Bp. Naumannia, 1854, p. 213; Bruch, J. f. Orn. 1855, p. 292; Salvin, Tr. Zool. S. ix. p. 506 (Galapagos).

Hab. The type of this species in the museum of Paris is said to have been obtained at Monterey, California, in November, by Dr. Neboux of the French frigate 'Vénus.' The only other specimen known to exist is in the British Museum, and was obtained during the voyage of H.M.S.'s 'Herald' and 'Pandora,' at Dalrymple Rock, Chatham Island, Galapagos group. The 'Herald' appears to have visited Chatham Island between the 11th and 16th January, a date which is worth bearing in mind, as the British-Museum specimen seems to be in fully adult plumage; the grey tint which pervades the lower part of the neck and breast in the Paris specimen, and which is probably a sign of comparative immaturity, having disappeared, leaving the hood well defined. But for the absence of the distinct collar at the bottom of the hood, and the narrow white band of feathers at the base of the upper mandible, this bird might be briefly described as a gigantic Sabine's Gull, the tail being rather more forked in proportion than in that species. It is certainly remarkable that, in spite of the researches of the American naturalists, no other speci-

[1] See above, p. 141.

men of this Gull should ever have been obtained in any part of California; and Mr. Salvin inclines to think the Californian locality an erroneous one, in view of similar mistakes known to have been made with the birds collected during the voyage of the 'Vénus.' It is on the other hand somewhat strange that if the head quarters of this Gull, of which the appearance is sufficiently striking to attract attention, are in the Galapagos group, none of the other visitors or naturalists should have brought any news of it.

Creagrus is one of Bonaparte's arbitrary and undefined genera; and there seems to be no structural difference to warrant the generic separation of this species from *Xema sabinii*.

In this paper I have from time to time acknowledged with much pleasure the assistance I have received from my friends and correspondents; and I have now to render my especial thanks to the authorities of the British and Cambridge Museums, and of the Smithsonian Institution, Washington, and to Dr. Brewer of Boston, to Professor Peters of Berlin, Professor Reinhardt of Copenhagen, M. Oustalet, M. Bouvier, Mr. O. Salvin, Mr. H. Seebohm, Mr. Harvie-Brown, Mr. Gervase Matthew, R.N., and Mr. E. Hargitt, for the opportunities they have severally afforded me of examining examples of rare species and also series of specimens.

P.S. (April 1st).—I take this opportunity of correcting an error in my paper on the *Sterninæ* (P. Z. S. 1876, p. 671) where two species are united under the name of *Anous cæruleus*. At that time I had not seen a specimen of the real *A. cæruleus*, Bennett; and that species and *A. cinereus*, Gould, are so very much alike that, until examples were available for comparison, the descriptions and plates might easily have been taken to refer to the same species in different stages of plumage. Seen by the light of further experience they appear to be distinct; and the following is their synonymy and habitat:—

ANOUS CÆRULEUS (Bennett).

Sterna cerulea, F. D. Bennett, Narr. Whaling-Voy. round Globe, ii. App. p. 248 (1840), Christmas Island, Pacific.

"*Sterne cendré*," Neboux, Rev. Zool. Oct. 1840, p. 291, et *Stolida cinerea*. id. Voy. 'Vénus,' Atlas, pl. 9 (1846); nec *Anous cinereus*, Gould, P. Z. S. 1845 (Pacific, N. of Equator).

Sterna teretirostris, Lafresnaye, Rev. Zool. 1840, p. 242, et *Procelsterna tereticollis*, id. Mag. de Zool. 1842, pl. 29: no locality; both described from a single specimen purchased from a dealer at Havre.

Anous parvulus, Gould, P. Z. S. 1845, p. 104 (described from a specimen obtained by Bennett at Christmas Island); Cassin, U.S. Expl. Exp., Birds, p. 393 (Honden Island, Low archip. 14° S., 138° W.).

Megalopterus plumbeus, Peale, U.S. Expl. Exp. p. 285 (1848), Honden Island.

Anous cinereus (Neb.), Finsch and Hartl. F. Central-Polynesiens, p. 239 (1867), Phœnix group, 3° 8′ S., 171° W., nec Gould.

Hab. Pacific, from a little north of the Equator; Christmas Island; the Ellice group, 9° S., 179° E., whence there are two specimens in the British Museum recently obtained by the Rev. S. J. Whitmee; the Phœnix group; and Honden Island, Low archipelago.

ANOUS CINEREUS, Gould.

Pelecanopus pelecanoides, G. R. Gray, L. Birds Brit. M. iii. p. 180 (Australia, presented by Sir T. Mitchell).

Anous cinereus, Gould, P. Z. S. 1845, p. 104 (N.E. Australia); id. B. Australia, vii. pl. 76 (1848), Norfolk I. and N.E. coast Australia.

Procelsterna albivitta, Bp. Compt. Rend. xlii. 1856, p. 773; Gould, Hand-b. B. Austr. ii. p. 420 (1865); Gray, Hand-l. iii. p. 123 (1871).

Sterna cinerea, Schlegel, M. P.-Bas, *Sternæ*, p. 38 (1863), Australia.

Anous albivittatus, Finsch, P. Z. S. 1877, p. 776 (Eua, Friendly group).

Hab. Norfolk Island; N.E. Australia and the Tonga or Friendly group, in about 22° S., 175° W. It is presumably the species observed by Mr. E. L. Layard in the Fiji group.

The range of these two species appears to be nearly parallel, that of *A. cæruleus* being the more northerly. *A. cæruleus* is smaller than *A. cinereus*, Gould, and is darker all over, especially on the underparts, which are blue-grey, whereas in *A. cinereus* they are nearly white. The differences are too great to be explained away as being due to age, and I admit the distinctness of the two species; but they are very closely allied. The fact of their being found in such close proximity within so limited an area is very remarkable.

February 19, 1878.

Prof. Mivart, F.R.S., V.P., in the Chair.

Mr. P. Geddes read a memoir on the mechanism of the odontophore in certain mollusca. In this paper the view of Cuvier that the movements of the radula depend upon those of the underlying cartilages was substantially revived. Arguments were adduced against the more recent theory of Prof. Huxley that it runs like a chain-saw, the cartilages merely forming a pulley-block. The use of bacteria as food by *Limnæus* was also described in the memoir, which will be published in the Society's 'Tranasctions.'

Mr. Sclater exhibited the skin of a fine adult Cassowary, which had recently been acquired for the collection of the British Museum. The specimen was labelled "Wandammen, May, 1876," and was

Head of *Casuarius salvadorii*.

believed to have been obtained by the collectors of Herr Bruijn, of Ternate. Wandammen is situated on the western coast of the Bay of Geelvink, near the southern extremity[1].

Mr. Sclater stated that the only Cassowary of the present form known from this locality was the species shortly indicated by Beccari in his "Lettera Ornitologica" (Ann. Mus. Civ. Genova, vii. p. 717) as *Casuarius tricarunculatus*[2]; but there were no traces whatever of a third wattle in the present specimen.

The form of the casque in the present bird was nearly that of *C. australis*, the summit being elevated high above the head, and much compressed laterally, but forming almost a point at the summit instead of a longitudinal ridge (see fig., p. 213). The wattles were two, one on each side of the median line, closely approximating at their bases, but divided down nearly to their origin, and about three inches in length.

The species, which Mr. Sclater considered to be new to science, must, he said, be placed in the first section of his arrangement as given in P. Z. S. 1875, p. 87, next to *C. galeatus*, from which the form of the helmet distinguished it. From *C. beccarii* of the Arru Islands it might be known by the more completely divided neck-wattles.

The whole length of the body of the bird, from the tip of the casque to the tip of the tail, was about five feet; the tarsus measured 12·5 in., the middle toe 8·5 in. The distance from the commissure of the mandible to the top of the casque was 7·5 in., the distance from the gape to the extremity of the bill 7·5 in.[3]

A communication was read from Mr. F. Day, F.Z.S., containing the following remarks on Mr. Whitmee's paper on the manifestation of fear and anger in Fishes, read at the last meeting.

"At the last meeting of the Society (February 5th), Mr. Whitmee read a paper on the manifestation of fear, anger, &c., by Fishes, observing that a recent author, 'On the Expression of the Emotions,' had entirely omitted allusion to this class of Vertebrates, whilst, as regards anger, he believed that no observations had been recorded. I propose offering a few remarks upon the foregoing, as well as upon some other subjects touched upon by Mr. Whitmee.

"The means of expression in animals adverted to by Mr. Darwin (excluding those of the ears, which would be out of place in fishes) are:—sounds, vocally or otherwise produced; the erection

[1] See the chart of Geelvink Bay in 'Cosmos,' vol. viii. tabb. 3 & 10.

[2] The only known specimen of *C. tricarunculatus* was, as Count T. Salvadori kindly informs me, still living in Ternate in July last, where it was seen by M. Laglaize.

[3] [Since these remarks were made I find that an example of this same Cassowary was exhibited by M. Oustalet at a meeting of the Association Scientifique de France on February 23rd, and the species named *C. salvadorii* (see Bull. Ass. Sc. de France, no. 539, vol. xxi. p. 349). I have therefore withdrawn my name in favour of that of M. Oustalet. I think it probable that the Cassowary from Southern New Guinea, formerly living in the Society's Gardens, which I referred (P. Z. S. 1875, p. 527) with some doubt to *C. beccarii*, is a younger individual of this same species.—P. L. S.]

of dermal appendages under the influence of anger or terror, which last would be analogous to the erection of scales and fin-rays in the class Pisces. Regarding special expressions, as those of joy, pain, astonishment, &c., we could hardly expect to find such so well marked in fishes as in some of the higher animals, in which the play of the features often affords us an insight into their internal emotions. Eyes[1] destitute of movable eyelids, cheeks covered with scales, or the head enveloped in dermal plates, can scarcely mantle into a smile or expand into a broad grin. We possess, however, one very distinct expression in fishes, which is absent or but slightly developed in many[2] of the higher animals—namely, change of colour. All are aware that when a fish sickens its brilliant colours fade, but less so how its colour may be augmented by anger, and a loss of it be occasioned by depression the result of being vanquished by a foe. Some forms also emit sounds when actuated by terror, and perhaps in times of anger; but of this last I possess no decided proofs.

"As regards manifestations of anger, Dr. Cantor makes the following remarks on the *Macropodus pugnax*[3]:—'When the fish is in a state of quiet, with the fins at rest, the dull colours present nothing remarkable. But if two are brought within sight of each other, or if one sees its own image in a looking-glass, the little creature becomes suddenly excited, the raised fins and the whole body shine with metallic colours of dazzling beauty, while the projected gilt membranes, waving like a black frill round the throat, add something grotesque to the general appearance. In this state it makes repeated darts at its real or reflected antagonist. But both, when taken out of each other's sight, instantly become quiet. . . . . The Siamese are as infatuated with the combats as the Malays are with their cock-fights, and stake considerable sums, and sometimes their own persons and their families. The license of exhibiting fish-fights is farmed, and affords a considerable annual revenue to the King of Siam.'

"The foregoing extract shows anger in fishes demonstrated by change in colour and the erection of the fins and gill-membranes. I will now give an observation respecting the three-spined Stickleback[4]. After a fight between two examples 'a strange alteration takes place almost immediately in the defeated party: his gallant bearing forsakes him; his gay colours fade away; he becomes again speckled and ugly; and he hides his disgrace amongst his peaceable companions, who occupy together that part of the tub which their tyrants have not taken possession of; he is, moreover, for some time the constant object of his conqueror's persecution.' In fact we here perceive how the disgrace of defeat affects the spirits of the

[1] Couch (Illustrations, &c., p. 305) says, "The faculty of giving forth brilliant light from the eyes, as in a cat, is said to have been observed by fishermen in the Blue Shark."

[2] Numerous examples of the Saurians are exceptions.

[3] Cantor, Catal. Mal. Fish, 1850, p. 87. Sir J. Bowring, in his account of Siam, p. 155, gives a very similar account of the battles of these fishes.

[4] Couch, 'British Fishes,' 1865, vol. iv. p. 172.

vanquished; this reacts on his health, and as a result his brilliant hues fade away. The conqueror, on the other hand, exulting in his victory becomes more resplendent; he does not forget his former triumph, and considers it no disgrace to occasionally lord it over his beaten foe.

"Fear is shown by fish in many ways. 'When hooked or netted they sometimes empty their stomachs by an instinctive act of fear, or to facilitate escape by lightening their load' (Owen, Comp. Anat. i. p. 419). There is not an angler unacquainted with the natural timidity of fishes, nor a keeper in charge of a salmon-pass, who does not know how easy it is for poachers to deter the salmon from venturing along the path raised expressly for his use.

"Amongst the coral-reefs of the Andaman Islands I found the little *Heliastes lepidurus* abundant. As soon as the water was splashed they appeared to retire for safety to the branching coral, where no large fish could follow them; so frightened did they become, that on an Andamanese diving from the side of the boat, they at once sought shelter in the coral, in which they remained until it was removed from the sea. In Burma I observed, in 1869, that when weirs are not allowed to stretch across the rivers (which would impede navigation), the open side as far as the bank, is studded with reeds; these, as the water passes over them, cause vibration, and occasion a curious sound alarming the fishes, which, crossing to the weired side of the river, become captured.

"Under the influence of fear or anger the well-known Climbing Perch of India (*Anabas scandens*) not only erects its spiny-rayed fins and its gill-covers, but also the scales on its body, even down to those along the base of the caudal fin [1]; this to a less extent, perhaps, appears common to spiny-rayed forms.

"Hooker, alluding to Gulls, Terns, Wild Geese and Pelicans in the Ganges valley, observes, 'These birds congregate by the sides of pools and beat the water with violence, so as to scare the fish, which then become an easy prey—a fact which was, I believe, first indicated by Pallas during his residence on the banks of the Caspian Sea' [2]. Fishes, under the influence of terror, dash about with their fins expanded, and often run into places which must destroy them. Thus droves and droves of Sardines in the East, impelled by the terror of pursuing Sharks, Bonitoes, Seir, and other voracious fishes, frequently throw themselves on the shores in enormous quantities. Friar Odoric, who visited Ceylon about 1320, says, 'There are fishes in those seas that come swimming towards the said country in such abundance, that for a great distance into the sea nothing can be seen but the backs of fishes, which, casting themselves on the shore, do suffer men for the space of three daies to come, and to take as many of them as they please, and then they return again into the sea' [3].

"Fishes frequently show distinct signs of affection. Yarrell ('British Fishes') mentions how a person who had kept two

[1] 'Fishes of Malabar' (1865), p. 133.

[2] Himalayan Journals, vol. i. p. 80.

[3] Hakluyt, vol. ii. p. 37.

small ones together in a glass vessel gave one away; the other refused to eat, and showed evident symptoms of unhappiness until his companion was restored: Pennant, how the River-Bullhead "deposits its spawn in a hole it forms in the gravel, and quits it with great reluctance:" General Hardwicke, how the Gouramy (*Osphromenus olfax*), in the Mauritius, forms a nest amongst the herbage growing in the shallow water in the sides of tanks. Here the parents continue to watch the place with the greatest vigilance, driving away any interloping fish. The amphibious walking fish of Mysore (*Ophiocephalus striatus*) appears to make a nest very similar to that of the Gouramy, and over it the male keeps guard; but should he be killed or captured, the vacant post is filled by his partner (Colonel Puckle). When very young the fishes keep with, and are defended by their parents, but so soon as they are sufficiently strong to capture prey for themselves they are driven away to seek their own subsistence (see 'Fishes of India,' p. 362). But it is not only these monogamous amphibious fishes which show an affection for their eggs and also for their fry, but even the little *Etroplus maculatus* has been observed to be equally fond of its ova. 'The eggs are not very numerous, and are deposited in the mud at the bottom of the stream, and, when hatched, both parents guard their young for many days, vigorously attacking any large fish that passes near them' [1].

"Although the proceedings of the members of the marine and estuary genus *Arius* and its allies show not quite so distinctly signs of affection, still it must be a well-developed instinct which induces the male to carry about the eggs in his mouth until hatched, and to remove them in this manner when danger is imminent. I have taken the ova just ready for the young to come forth out of the mouth and fauces of the parent (male) fish; and in every example dissected there was no trace of food in the intestinal tract.

"At many temples in India fishes are called to receive food by means of ringing bells or musical sounds. Carew, in Cornwall, is said to have called his Grey Mullet together by making a noise like chopping with a cleaver. Lacépède relates that some fishes, which had been kept in the basins of the Tuileries for more than a century, would come when called by their names, and that, in many parts of Germany, Trout, Carp, and Tench are summoned to their food by the sound of a bell. These instances are doubtless mostly due to the fishes having learnt by experience that on the hearing certain sounds they may expect food. But Lacépède mentions that some were able to distinguish their individual names; and the same occurs in India. Lieutenant Conolly remarked upon seeing numerous fishes coming to the Ghaut at Sidhnath to be fed when called; and on 'expressing our admiration of the size of the fish, "Wait," said a bystander, "until you have seen *Raghu*." The Brahmin called out his name in a peculiar tone of voice; but he would not hear. I threw in handful after handful of ottah (flour) with the same success, and was just leaving the ghaut, despairing and doubting,

[1] Jerdon, 'Madras Journal of Literature and Science,' 1849. p. 143.

when a loud plunge startled me. I thought somebody had jumped off the bastion of the ghaut into the river, but was soon undeceived by the general shout of "Raghu, Raghu," and by the fishes, large and small, darting away in every direction. Raghu made two or three plunges, but was so quick in his motions that I was unable to guess at his species'[1].

"Although I have alluded to an increased brilliancy of colour being caused by anger, and a dull hue occasioned by terror or illness, there appears to be still another cause at work. During the breeding-season some species, such as *Periophthalmus schlosseri*, appear to become more brilliant, especially the males, as I have observed in my report on the freshwater fishes of Burma.

"Pallegoix states that in Siam the Dog's-tongue is a fish shaped like a Sole; it attaches itself to the bottom of boats, and makes a sonorous noise, which is more musical when several are stuck to the same boat and act in concert (vol. i. p. 193). These noises can scarcely be due to anger or fear. Sir J. Bowring (vol. ii. p. 276) also remarks upon having heard this fish, 'which sticks to the bottoms of the boats, and produces a sound something like that of a Jew's harp struck slowly, though sometimes it increases in loudness, so as to resemble the full sound and tones of an organ. My men have pointed me out a fish about four inches long as the author of the music.'

"Some years since, at Madras, I obtained several specimens of a freshwater Siluroid fish (*Macrones vittatus*) which is termed 'the fiddler' in Mysore. I touched one which was on the wet ground, at which it appeared to become very irate, erecting its dorsal fin, making a noise resembling the buzzing of a bee, evidently a sign of anger or terror. Having put some small Carp into an aquarium containing one of these fishes, it rushed at a small example, *seized it by the middle of its back*, and shook it like a dog killing a rat; at this time its barbels were stiffened out laterally like a cat's whiskers[2].

"Many fish, when captured, make noises, perhaps due to terror. Thus the *Caranx hippos*, *Tetrodon*, and others grunt like a pig. Darwin (Nat. Journ. vol. vii.) remarks on a *Silurus* found in the Rio Parana, and called the Armado, which is remarkable for a harsh grating noise when caught by hook and line; this noise can be distinctly heard when the fish is beneath the water.

"Aristotle and Ælian were aware of this faculty in some of the fishes of the Mediteranean[3].

"The Cuckoo-Gurnard (*Trigla pini*) and the Maigre (*Sciæna aquila*) utter sounds when taken out of the water[4]; and Herrings, when the net has been drawn over them, have been observed to do

[1] "Observations on the Past and Present Condition of Onjein," 'Journal of the Asiatic Society of Bengal,' vi. p. 820.

[2] 'Fishes of India,' p. 449.

[3] See 'De Animal.' lib. iv. cap. ix.; Ælian, lib. x. cap. xi.; Pliny, lib. ix. cap. viii. and lib. xi. cap. xviii.; Athenæus, lib. vii. cap. iii. & vi.

[4] Yarrell, 'British Fishes,' i. pp. 44–107.

the same: 'this effect has been attributed to an escape of air from the air-bladder; but no air-bladder has been found in the *Cottus*, which makes a similar noise.'

"The Lesser Weaver buries itself in the loose soil at the bottom of the water, leaving only its head exposed, and awaits its prey. If touched, it strikes upwards or sideways; and Pennant says it directs its blows with as much judgment as a fighting-cock (Yarrell, vol. i. p. 26). Fishermen assert that wounds from its anterior dorsal spines are more venomous that those caused by the spines on its gill-covers.

"As regards fighting, I should suppose that, unless some portion of the body is peculiarly adapted for this purpose, as the rostrum of the Sword-fish, or the spine on the side of the tail in the Lancet-fishes, we must chiefly look to the armature or covering of the jaws for weapons of offence.

"And this naturally leads us on to ask if, as suggested by Mr. Whitmee, 'the chief purpose served by fishes' spines is protection against the attacks of those of the class which are carnivorous.' The first inquiry is, Do the carnivorous forms most abound amongst *Acanthopterygians* or *Malacopterygians*? The spiny-rayed forms (speaking as a whole) have the teething far better developed than the soft-rayed Carps of the fresh waters, or the Herrings of the sea, the former (spiny-rayed forms) being the most carnivorous, the latter (or soft-rayed fish) being preyed upon by the former, and by the *Elasmobranchii*.

"I observed[1], 'It may not be amiss to point out that the Acanthopterygian or spiny-rayed fishes appear to be most numerous in the ocean (preying upon their articulated-rayed neighbours, the Clupeidæ, &c.); but as we examine waters more inland, the Salmonidæ or Cyprinidæ usurp their place, these latter not being possessed of spinate, but merely articulated rays. A maritime residence appears most adapted for the Acanthopterygian or spiny-rayed fishes, a fresh-water inland one to the Malacopterygians or spineless forms.'

"Spinate dorsal and anal fins being much more frequent in the carnivorous and voracious forms than in their weaker neighbours leads me to suppose that they must have some other function than protection of the fish from its enemies. One of these is probably to guard the fin-membrane from injury, for which purpose spines are much better adapted than rays in fast-swimming species. One has only to witness how commonly the spineless anal fins of Clupeoids and Siluroids are found injured in the tropics, to feel sure that much of this is owing to the absence of spinate protection. We do not see the same injury existing to any thing like a similar extent in Teleosteans whose fins are armed with strong spines; but in the intermediate forms, as the first dorsals of Sier-fishes (*Cybium*), the weak spines of the fins are frequently injured.

"Mr. Whitmee remarked that in serious attacks fish 'always turned suddenly round and lashed at one another with the caudal fin;' and he continued that he believed *serious fighting is always*

[1] 'Journal of the Linnean Society, Zoology,' vol. xiii. p. 111.

done with the tail. Here I am unable to concur. Fish, the same as other animals, when they commence to fight, employ that portion of the body most suited to such a purpose. Thus the Perch will employ his teeth, the Sword-fish his elongated snout, the Lancet-fish the spine at the side of its tail, the Siluroid may use his dorsal or pectoral spine. Instances of all these modes of attack may be referred to.

"Continuing Couch's illustration of the Stickleback, he observes, 'The bite of these little furies is so severe that I have frequently known it, when inflicted on the tail, produce mortification and, consequently, death. They also use their lateral spines (ventral fins) with such fatal effect that, incredible as it may appear, I have seen one during a battle absolutely rip his opponent quite open, so that he sank to the bottom and died.'

"That the Sword-fish employs his sword-like projection for this purpose is well known; frequent examples occur of his driving that formidable weapon into ships, whilst, according to Swainson, he is very fierce, and attacks a Whale whenever he encounters one; other observers, however, represent the Sword-fish as gentle and inoffensive except to Whales.

"The Lancet-fish as it swims past its enemy tears up an open wound.

"As regards the Siluroids we have more than one mode of attack; but I do not know of any Siluroid that employs its tail for this purpose. In one of the Siluroids of the Ohio 'the first ray of the dorsal is formed of a very strong, sharp spine, which the animal uses to kill others of a smaller size; for this purpose it gets beneath the fish it intends to attack, and then, suddenly rising, wounds it repeatedly in the belly.'

"Mr. Whitmee supposes that most carnivorous fish capture their prey by outswimming them; but to this there are numerous exceptions. The Angler, or Fishing Frog (*Lophius piscatorius*), 'while crouching close to the ground, by the action of its ventral and pectoral fins, stirs up the sand and mud; hidden by the obscurity thus produced, it elevates its appendages (situated on the upper surface of the head), moves them in various directions by way of attraction as a bait, and the small fishes approaching either to examine or to seize them, immediately become the prey of the Fisher' (Yarrell). In India we find a freshwater Siluroid (*Chaca lophioides*) which 'conceals itself among the mud, from which, by its lurid appearance, and a number of loose filamentous substances on its skin, it is scarcely distinguishable; and with an immense open mouth it is ready to seize any small prey that is passing along' (Ham. Buchanan). In March 1868 I obtained a fine example of *Ichthyscopus inermis* ('Fishes of India' p. 261), which I placed in water having a bed of mud: into this it rapidly worked itself, first depressing one side and then the other, until only the top of its head and mouth remained above the mud, whilst a constant current was kept up through its gills. It made a noise, half snapping and half croaking, when removed from its native element. This sound I consider most probably due to fear. Some fish, in

short, invariably seize their prey with their mouths, and that without calling the caudal fin into play. In fact, a stroke with the tail appears sometimes to denote contempt in fishes; it is not rare that anglers find fishes sometimes swim up to their bait, which they not only refuse, but, giving it a lash with their tail, decline to rise any more. This may, however, be a symptom of curiosity, which is largely developed in the finny tribe.

"I might multiply instances from many authors, but consider those adverted to are sufficient to show that various ichthyologists have remarked upon the emotions of anger and terror in fishes being shown by the erection of their dermal appendages and gill-covers, as well as by changes of colour, whilst terror induces some species to emit sounds that are not commonly perceived; that fishes sometimes show affection for their partners in captivity, mourning their removal; that they may be tamed sufficiently to come to a recognized sound, even to individual names that have been bestowed upon them; and that some species have an instinctive affection for their eggs and young, which they guard against intruders with the greatest determination.

"At the present time, in the Royal Westminster Aquarium, is a live example of the Electric Eel (*Gymnotus electricus*) which has in its electric organs the means of showing when it is affected by anger or terror. Some consider this curious property is for protection against Alligators; it is certainly used against fishes for the purpose of obtaining food; but when we remember how, when the Indians drive in horses and mules to the waters infested by the Eels, they immediately attack them, we must admit that such cannot be for the purpose of preying upon them, but is due to anger or terror at being disturbed."

Mr. Whitmee being unable to attend, the Secretary read the subjoined reply to Mr. Day's remarks.

"By the courtesy of the Secretary I have seen Mr. Day's comments on my paper. As I cannot attend the meeting to-morrow evening, I crave the liberty of presenting two or three written observations.

"1. My paper was written in Samoa in 1875; and my position there, of course, prevented me from having access to the whole literature of this subject. I was aware of the conduct of the Stickleback in guarding its nest, and also of similar conduct in some other fishes. But my object was to show, in opposition to a view quoted, that fishes, as a class, manifest as much feeling as most other animals. In stating that I had not met with observations showing this, I did so as an excuse for presenting a paper which I feared possessed little intrinsic value. I am glad the paper has led Mr. Day to bring forward so much evidence in confirmation of the view I advocated.

"2. Mr. Day gives a more general application than I intended to my observations about the mode of fighting with the tail. I stated an observed fact, viz. that certain fishes in my aquarium, when fighting, lashed at each other with their tails. From this I inferred

that such a mode of attack might be common among most, not all, fishes. Of course, those which possess more effective weapons in another part of the body would not resort to such a mode of warfare.

"3. As to the way in which carnivorous fish capture their prey, I said, 'doubtless *most* do it by outswimming them,' and not that *all* do this. In P. Z. S. for 1875, p. 545, I mentioned an observed fact of an *Antennarius multiocellatus* angling for small fish. Of course no one would ever imagine that the slow-moving fish mentioned by Mr. Day would outswim their prey."

1. Notes on the Anatomy of *Tolypeutes tricinctus*, with Remarks on other Armadillos. By A. H. Garrod, M.A., F.R.S., Prosector to the Society.

[Received January 14, 1878.]

The Society purchased, on the 3rd of October 1877, a young female living specimen of the Apar (*Tolypeutes tricinctus*), which was the first example of the species exhibited alive in the Gardens, and probably the first ever brought alive to this country. It was in bad health on its arrival, and, never recovering, died, without any visible lesion, on the 27th of December following. Its death has given me an opportunity of determining some of the most important points in its anatomy, which may be accepted as a supplement to Dr. Murie's valuable and elaborate memoir on *Tolypeutes conurus* in the 'Transactions of the Linnean Society' [1].

The measurements of the specimen under consideration are as follows:—

	inches.
From tip of nose to base of tail	12·55
Length of head	2·8
Length of tail	2·1

from which it is evident, on comparison with the table of measurements of the specimens in the national collection given below, that the individual was not adult, but fairly grown.

The differences between the two known species of the genus *Tolypeutes* are so slight that it may be worth while referring to them before going further. It is to M. Geoffroy Saint-Hilaire that we owe the discovery of the second species (*T. conurus*); and his most lucid description is to be found in the 'Comptes Rendus' for 1874 [2]. Therein the history of the Apar is fully expounded, references being given to all previous important accounts of the animal.

It is in the central portion of the cephalic shield that the most important peculiarities are to be seen. The marginal plates of the posterior two thirds of this shield form a regular series, and enclose other larger plates—namely, a posterior median plate, followed ante-

[1] Vol. xxx. p. 71. [2] Vol. xxiv. p. 572.